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The potters' perspectives: A vibrant chronology of ceramic manufacturing practices in the valley of Juigalpa, Chontales, Nicaragua (cal 300 CE - present)

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The Potters' Perspectives

A Vibrant Chronological Narrative of Ceramic Manufacturing Practices
in the Valley of Juigalpa, Chontales, Nicaragua
(cal 300 CE - present)

Natalia R. Donner

Leiden University Press

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The Potters' Perspectives

A Vibrant Chronological Narrative of Ceramic Manufacturing Practices in the Valley of Juigalpa, Chontales, Nicaragua (cal 300 CE - present)

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To Lina, because

"No has dejado de existir:
Has existido siempre
y existirás siempre
(no sólo en éste,
en todos los universos).
Pero es cierto,
una sola vez viviste,
pensaste,
amaste.
Y ahora estás muerta.
Es estar digamos como la tierra, o la piedra, que es lo mismo,
«la piedra dura porque esa ya no siente».
Pero no, nada de piedra dura,
sí estás sintiendo,
más allá de la velocidad de la luz
del final del espacio que es el tiempo,
totalmente consciente,
dentro de la conciencia
vivicísima
de todo lo existente."

(Ernesto Cardenal)

1 Central Nicaragua: when the center is the periphery

I have many blurred memories about my ideas, preconceptions and biases regarding Nicaragua before setting foot for the first time in the country. As far as I remember, my first encounter with the land of Sandino happened when I was about 14 years old and I listened for the first time to the song *Canción urgente para Nicaragua*, by Cuban songwriter Silvio Rodríguez. The lyrics elated me because they spoke about a Latin American nation, united against dictatorship, oppression, and colonialism. Similar to many teenagers growing up in Argentina during the 1990s, I had a mild obsession with the work of Julio Cortárzar. Therefore, I became curious about his participation in the Sandinista revolution, which I was completely ignorant of. Pictures and footage of the *Rayuela* author that showed the active involvement writers could have in sociopolitical processes gave me hope that humanistic and artistic endeavours could act as agents of social transformation. Years later, while I was in college at the Universidad Nacional de Rosario (Argentina), we dedicated a whole unit of the class "Social Latin American History" to the Sandinista Revolution. We read texts by Mires (1986), Vilas & Harris (1985), and Lozano (1985) to compare the Nicaraguan insurgency to other revolutionary processes in Latin America, such as those underway in Mexico, Bolivia, and Cuba. Through authors like Knight (2016) and Löwy (2007) we tried to understand these movements within our Latin American context, taking into account biopolitics and the influence of Marxism in our continent.

During my university years in Mexico, Nicaragua was briefly mentioned as the southeastern border of the pre-Hispanic macrocultural area called Mesoamerica (Kirchhoff 1943), or through afternoons reading the beautiful poems by Rubén Darío.[1] Finally, living in Panama I was faced with a different spectrum of Nicaraguan reality and history, when I met numerous Nicaraguan migrants who had fled the civil war and economic constraints to find better opportunities. Hope and discrimination were daily meals for these parents, who in some cases spent decades away from their children in order to provide them with food, shelter, and—under the best circumstances—an education. The legendary rivalry between Nicaragua and Panama regarding the trans-isthmian canal fed the Panamanian self-image of progress and first-worldliness, which blinds them against the brutal inequality and unequal distribution of wealth inherited from their American colonial "past". The renewed hopes for a canal project in Nicaragua, fed by the Ortega regime at the beginning of the last decade, echoed this historical antagonism.

This mosaic of impressions was the clouded view I possessed in June 2014, when I first hopped on a plane from Panama City to Managua. The person sitting next to me, a Nicaraguan middle-aged man who had lived in Miami since the 1980s, was very excited to hear about the purposes of my visit and gladly gave me advice, as well as offering me a summary of his country. First, he spent several minutes telling me about Rubén Darío's life, his work, and how his beautiful words were the expression of what Nicaraguan idiosyncrasy was capable of creating. He assured me that the best cities to visit were Granada, León, and Managua, where I would find good food, cultural activities, economic development, and progress. He reminisced about

1 In this book, terms such as pre-Hispanic, pre-conquest, and pre-European are used interchangeably to signal the development of indigenous communities before and after European invasion. However, these concepts do not neglect the historicity of these societies prior to this historical event; on the contrary, this text challenges the pre/post-colonization classical divide.

the 1972 earthquake and its devastating outcome. He was sad to know that my final destination was Juigalpa, in the central department of Chontales, east of the big lake, where he was convinced there were more cows than people. He was not relieved when he heard that I was originally from a country with exactly the same demography, so a higher ratio of people versus cows was not really a problem for me.

Chontales was mainly seen as cowboy land, where large pickup trucks, leather boots, plaid shirts, *sombreros*, *machetes*, rifles, AK-47s, pistols, and *machismo* were part of daily life. According to him, the province lacked culture, education, and progress; the *hípico* parade, the *carnavales*, and the *fiestas patronales* were described as Roman bacchanals where alcohol, drugs, pickpocketing, lust, fights, and even murder were the rule. In sum, the area was only good for its meat, cheese, and milk production. When I asked him about the Caribbean coast, the expression on his face darkened. He explained to me that those were "Other" people, darker, with other ways of being, and a different food and language; he told me in a worried tone that some of them did not even speak Spanish. In his view, the east of Nicaragua was not really even part of the country. There are in fact two autonomous regions, the *Región Autónoma de la Costa Caribe Sur* (RACCS) and *Región Autónoma de la Costa Caribe Norte* (RACCN), that—in his opinion—governed themselves, and their development was very much independent from the rest of the nation. Additionally, he made it very clear that while the Pacific coast and the central mountainous regions were very safe, the Caribbean watershed was characterized by crime, so he did not suggest visiting it—although he somewhat ignored the problematic northern border with Honduras. Instead, he advised me to fly to Corn Island and see the Nicaraguan Caribbean from the nice beaches of white sand and turquoise water, not from the ugly mainland mangroves.

In a way, I was familiarized with this *othering* of Caribbean populations in southern Central America, with the historical processes that differentiated them from the Pacific coast settlements, such as the British and then American presence, the higher numbers of descendants of enslaved people, and their isolation from national policies and narratives. Also, I was aware that this *othering* was directly related to the denial of African as well as indigenous roots in modern southern Central American populations, in spite of clear cultural and genetic connections.[2]

However, once I started delving more in the archaeology of the country, I realized that this contemporary divide had been almost literally translated to the archaeological discourse **(figure 1)**. Since Kirchhoff's mostly unquestioned proposal (Kirchhoff 1943), which regarded Mesoamerica as a pre-European conquest macrocultural area, the cultural region baptized as Greater Nicoya (Norweb 1961), which spanned from the Gulf of Fonseca all the way down Pacific Nicaragua until the Nicoya peninsula and the Guanacaste region in northwest Costa Rica, served as the southeast frontier of Mesoamerica. Accordingly, the Nicaraguan Pacific was directly associated to Mesoamerica through stylistic approaches in material culture, especially ceramics, which appeared to show a shared polychrome tradition. However, this only partially represents pottery manufacturing and consumption practices, as well as practices more generally. Next was the central region—where Chontales is situated—which was considered no man's land, or *tierra de nadie* (van Broekhoven 2002). Very scarce indigenous populations lived here in pre-conquest times, and their most outstanding achievements consisted of a local stone sculpture tradition, as well as their connections with the polychrome tradition from the Greater Nicoya cultural area.[3] Finally, there was the Caribbean coast, where nothing remarkable had happened in the pre-colonial past, except for some isolated shell midden sites.

Unfortunately, the archaeology of southern Central America has been signated[4] by a discursive agenda that involves narratives about migration, cultural diffusion, and spheres of influence, stressing the "intermediateness", "lowness", and "middleness" of its ancient groups of people. Within this meta narrative, names such as Intermediate Area (Haberland 1957; Willey 1959)—in the middle

2 See Perego *et al*. (2012) for a good example of the contrast between identity discourses and genetic legacies in the region, focusing on a case study from Panama.

3 Representation of these materials either produced in the Pacific coast of the country or manufactured locally, following Greater Nicoyan standards, was extremely low in the archaeological record of central Nicaragua, comprising less than 5% of excavated materials (Gorin 1990).

4 Throughout this book, this verb is used in Agamben's sense (Agamben 2010).

Figure 1: Map of Nicaragua schematically displaying the three main cultural areas reflected in archaeological discourses as well as modern geographic and idiosyncratic narratives.

of what, or who?—were acceptable and valid. Consequently, the classifications of material evidence from ancient communities, especially in the case of ceramics, have been often designed and executed to understand the movement of groups described by early ethnohistoric accounts. The presence or absence of certain aesthetic and morphological traits, regardless of their frequency, has been uncritically associated to specific ethnic groups. More specifically, the presumption that around cal 800 CE diverse groups from Mesoamerica arrived at Greater Nicoya has played a crucial role in not only the history of the archaeology of that specific sector, but of the history of the entire Nicaraguan nation. Consequently, chronological overviews of different regions throughout the country, especially Central Nicaragua (Gorin 1990), have been designed with a sampling strategy favoring Greater Nicoyan-like ceramics and have forced the local data to match supposed inter-regional trends.

As a result, a biased portrait of the life of ancient Nicaraguan indigenous communities emerged and came to dominate both academic and non-academic views. Their supposed lack of monumentality, low social complexity, and the presumed simplicity of their artistic styles—especially when compared with Mesoamerica and the Andes—provided the perfect excuse to focus more on external influences than local developments (Lange & Stone 1984). The extent of this bias favoring culture historical boundaries and conceptions related to social complexity is overwhelming. For example, ceramic polychromes were traditionally believed to originate either in South America (Coe 1962) or Mesoamerica (Baudez 1967). Their iconography and morphology, especially in the Greater Nicoya region, has been directly connected with the Gulf of Mexico, the Mixteca-Puebla tradition, and the southern Maya area. In spite of the fact that the earliest evidence for ceramic

polychromy in the country was recovered from the Caribbean watershed (Gassiot Ballbè & Palomar Puebla 2006; Vásquez Moreno 2016), research on Pacific polychromy (Lange 1971a; Hoopes 1987; McCafferty & Steinbrenner 2005b; Steinbrenner 2010; Dennett 2016) has been disproportional when compared to the amount of studies in the Caribbean (Magnus 1974). In turn, other traces of ancient practices that would have been interpreted very differently if found in Greater Nicoyan contexts, such as griddles (Martínez Somarriba 1977), monumental mound building (Clemente Conte & Gassiot Ballbè 2004; Clemente Conte *et al.* 2013; Geurds & Terpstra 2017; Auziņa 2018), stone sculpture associated to public spaces and integrated within architecture (Geurds in press), are systematically ignored in culture historical and chronological meta-narratives.[5] It appears that the archaeology of southern Central America has been solely focused on writing a history of asymmetrical interactions with Mesoamerica based on the presence and frequency of Greater Nicoyan types instead of first studying local histories and then establishing how these communities interacted with both their close and distant neighbors.

1.1 GOALS

This book, which is part of the Proyecto Arqueológico Centro de Nicaragua (PACEN), under the direction of Dr. A. Geurds, aims to question these dominant narratives through the study of specific practices, primarily ceramic manufacture, in a small valley located northeast of Lake Cocibolca **(figure 2)**, an area originally included in the Greater Nicoya maps only due to the scarce presence of a series of ceramic types associated to Pacific Nicaragua. Clay sources—and therefore clay related industries—are readily available throughout the research area. In fact, scholars have pointed out that the meaning of the word Mayales—the name of the river that irrigates the valley—means "muddy river" in Matagalpan language (Incer 1985; Gorin 1990). Ever since humans first occupied this valley, clays were an integral part of the local landscape. Therefore, the interrelationships between these communities and clay outcrops, as well as the different processes that have transformed them, can be historicized.

In an attempt to transcend overly abstract, textualized, and mentalistic approaches to culture (Basu & Coleman 2008), this manuscript conceptualizes material culture as an embodiment of the intersecting itineraries between people, things, and environment. Accordingly, culture is seen as "(...) a series of processes by which new and old practices are adapted and adopted" (Harrison 2010, 36) and not as a collection of objects associated to a certain group or groups of people. Therefore, as a ceramicist, I study the gestural (dis)continuities of communities of practices related to pottery production, a daily and socially learned bodily practice in both pre-Hispanic and current times. To do so, ceramic *chaînes opératoires* are examined as the physical traces of historically and socially situated non-textualized gestures, taking into account that they are less prone to manipulation than oral and written histories (Gosselain 2018, 2).[6]

This research aims to explore the microhistories of ceramic *chaînes opératoires* situated in the context of sites featuring architecture. Ceramic production in the research area is a traditional practice that has been active for at least the last 1600 years. Nowadays, the craft has been deeply transformed through the utilization of vessels produced with materials introduced following European colonization and globalization, such as metal, glass and more recently plastic, as well as by the increasing economic hardships that have forced migration out of rural areas. Technological changes such as these are discourse shifts (Foucault 1968), rearrangements of power that permeate the ways people live, including how they move and eat (Bourdieu 1977; Dietler 2007; Twiss 2012), as well as the objects they create (Gosselain 2018). In this book, continuity and change in ceramics is not separated from the rest of practices that shape human experience. The chronology of the valley of Juigalpa presented here is not a ceramic chronology, but a history of the unfolding traces of different practices entangled in human-valley interactions through space-time. The results of this research are therefore not organized in Cartesian chronological

5 Clemente Conte and Gassiot Ballbè (2004) reported massive concentrations of basalt columns or monoliths that were circular in cross-section at Las Limas and Bella Vista. These monoliths were also documented as construction materials for mounds.

6 See chapter 3 for a detailed definition and discussion of the concept chaîne opératoire.

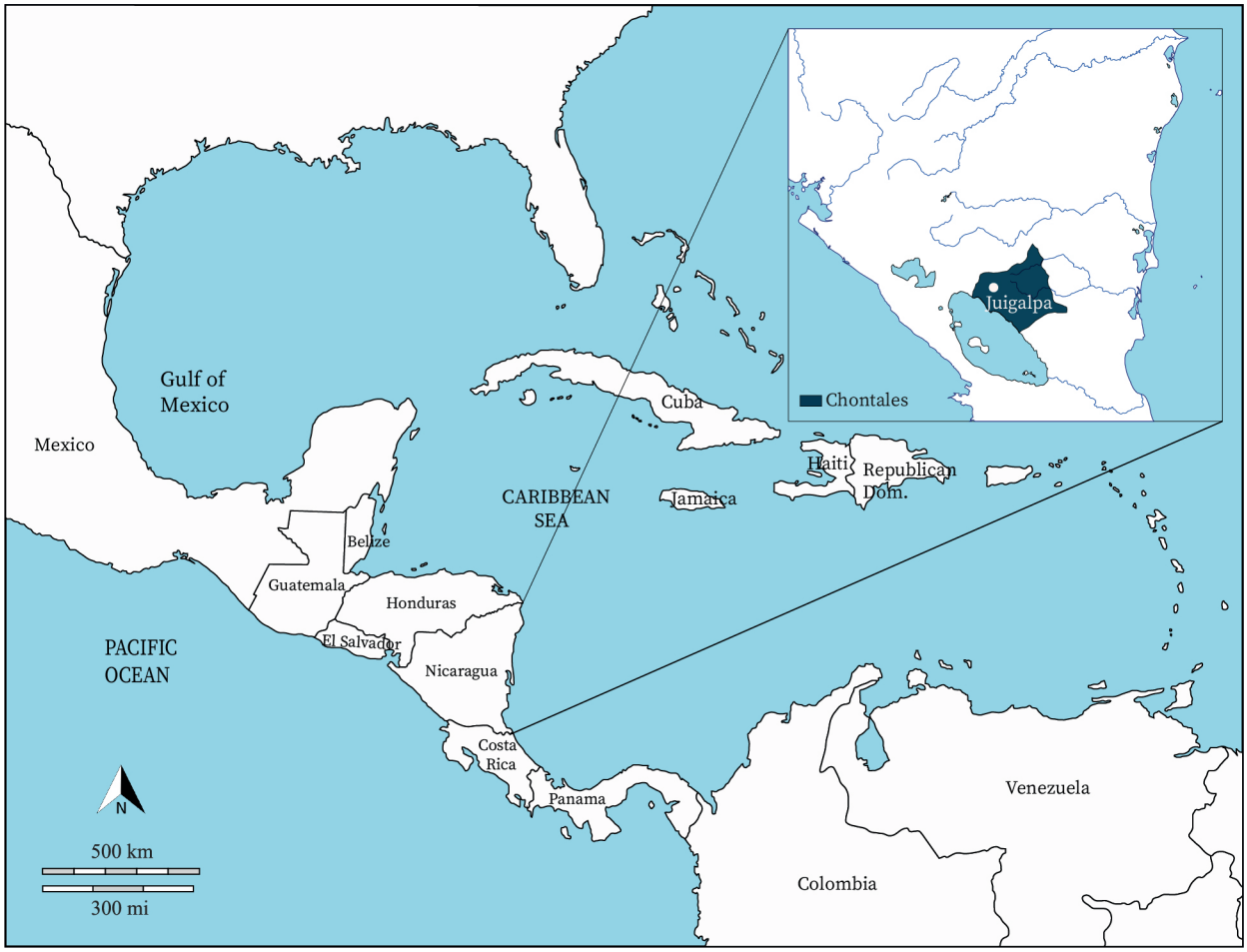


Figure 2: Map of Nicaragua showing the location of the valley of Juigalpa.

charts that are designed according to a geometric paradigm of time, which simplify history into the intersection of X and Y axes. Instead, a chronology is presented here as a vibrant narrative in which the divergent itineraries of practices intersect and interweave in diverse bundles over various time scales.

1.2 RESEARCH QUESTIONS

In order to fulfill these goals, this manuscript is structured according to a series of general and specific research questions. These inquiries not only aim to establish a chronology of human itineraries in the valley of Juigalpa, but also to challenge the craft of chronology building in archaeology from a practice theory approach, incorporating multipe time scales and rhythms of change.

- To what extent is the current map of archaeological sites in the valley of Juigalpa and the ceramic sequence proposed by Gorin (1990) biased towards finding connections with the Greater Nicoya? Does this bias extend beyond Chontales to other areas? (see chapter 2).
- In what manner does the dominant concept of time in archaeology signate our chronology building efforts? (see chapter 3).
- How can these theoretical biases be challenged through a comprehensive research plan? (see chapter 4).
- What archaeological evidence found in the valley of Juigalpa can aid in the construction

of a chronological narrative? (see chapter 5). Which strategies should be applied to build a chronology based on technical gestures and not ceramic types? (see chapters 3, 6, 7, and 8).

- What types of approaches and analyses would shed light on socially situated (dis) continuities within the research area? (see chapters 3 and 6).
- How can we visually represent intersecting microhistories as chronological narratives? (see chapter 8).
- How can these new data regarding human interaction within the valley of Juigalpa aid in challenging the current conception of time in archaeology? (see chapter 8).

1.3 OUTLINE

In order to answer these questions, this manuscript is structured in seven different chapters, in addition to this introductory chapter. The second chapter, *Narratives of place(s) and time(s)*, begins by providing general information about the location of the research area, the history of its plate tectonics, and its geology, geomorphology, hydrography, soils, flora, fauna, and climate, as well as a brief overview of its historical geography. Afterwards, the various ceramic chronologies that have been proposed to organize Nicaragua's archaeological past are discussed, mainly focusing on the Caribbean watershed, the Pacific coast, and central Nicaragua, the regions with the longest history of archaeological research. In the third chapter, *Just a matter of time?*, an overview of the theoretical (and therefore ideological) views from which this research originated is included. An outline of the conceptions of time within archaeology, systematized as the chronological paradigm that rules the discipline today, is provided. Also, the chapter discusses the palimpsestic ontology of materiality, its intersecting relationships to bodily gestures, and how the study of the different steps involved in ceramic manufacture can shed light in ancient lifeways. Also, ideas regarding style are defined, and a model for vibrant chronologies is proposed. Chapter 4, *Fieldwork methods*, provides a detailed explanation of the methods and techniques applied during the five fieldwork campaigns conducted in Nicaragua between 2015 and 2016, which were designed to sample ceramics for this technological study. Chapter 5, *Spatiotemporal dataset*, presents the complete and detailed description of the seven different contexts where the analyzed samples were retrieved from, through controlled stratigraphic excavations. A general overview of each of the archaeological sites is included, as well as a detailed stratigraphic analysis. Then, in *Laboratory methods and techniques for ceramic analysis*, the different approaches applied to study the ceramic fragments recovered from excavation are explained, which include macrofabric, macrotrace, petrographic, and morphometric analyses. Alongside that, a brief overview of the absolute and relative dating methods applied in this research is presented. In chapter 7, *Ceramic technologies in the valley of Juigalpa*, the results of the ceramic analysis are presented, including a reconstruction of operational sequences. Then, in the section *From traces on sherds to the vitality of human experience*, the data collected both in the field and in the lab is discussed in order to compose a vibrant chronology of different itineraries of practices in the valley of Juigalpa. This overview is compared with the previously accepted chronology (Gorin 1990). Some thoughts regarding AMS dating methods in the region of study are shared, as well as some ideas regarding future research in the area. Finally, the manuscript includes some concluding remarks.

1.4 FROM PAST TO PRESENT

After spending 12 months in Nicaragua, I am happy to confess that the country has left invisible but deep marks on my body, in the way I speak my native language, I eat, and I view "my" continent and its turbulent history. I felt the emotional palimpsests present in a society that is recovering, forgiving, and rebuilding itself from a long and painful civil war; a dormant conflict that the repression of 2018 and subsequent incarcerations and disappearances woke up from a long and oppressive slumber. I acquired the skill to respect certain silences and to listen to tough stories when their protagonists decided to tell them. I discovered the marvelous poetry of Ernesto Cardenal and his fascinating experience on the Solentiname Islands. I saw more poverty and inequality than what I was probably prepared for, I met outstanding human beings that taught

me to experience my surroundings with different eyes: to view soils, water, trees, animals, winds, rain, and sunlight as allies. These—and many more—connections that I built with Nicaragua, its history, its people, its landscapes, its biodiversity, its lakes, lagoons, sea, and ocean have permeated my research from the beginning. Therefore, in this text, ceramics are not regarded in the traditional way that dominates southern Central American archaeology, in which the study of materiality encounters a dividing wall between pre-European and post-European societies. In contrast, I opted to write a history of a traditional craft that continues through the present because I believe that viewing potting traditions as an intersection between people, objects, times and places, can aid in the production of locality (Appadurai 2001) in a bottom-up view of heritage. Therefore, research that goes from the local to the regional not only challenges the authorized or authorizing heritage discourse (Smith 2006) but also transforms archaeological inquiry into a critical assessment of the relationship between things and people through practice in the present, the past, and the future.

2 Narratives of place(s) and time(s)

Communities, their particular potting traditions and technical styles develop in a complex network of intersecting itineraries of human practitioners, animals, insects, plants, trees, water sources, soils, geology, and geomorphology. Therefore, this chapter, which aims to contextualize the research area both spatially and chronologically, is divided in two sections.

The first section of this chapter situates the research area, the valley of Juigalpa, which is part of the Mayales River subbasin, located in the modern department of Chontales, central Nicaragua, within its broader national context. Detailed descriptions of the geography and geology of the research area are presented, both in regional and local scopes, which are of relevance for interpreting the macrofabric and compositional analyses that form the building blocks of Chapters 7 and 8. Then, geomorphology and hydrography of the region of interest will be briefly examined, which is necessary to understand landscape perceptions and spatial choices, which are discussed in Chapter 8. Later, the available data on soils in the study area will be reviewed because they are necessary for the stratigraphic interpretations in Chapter 5 and are also related to the discussions involving clay procurement practices in Chapter 7. Also, data on climate and precipitation is included, since they play a role in human choices in the area, as well as in zoological and botanical trajectories. Later, the current flora and fauna will be examined in an attempt to establish a series of human-plant and human-animal interactions despite the differences between modern species and pre-Hispanic ones.

Once spatially situated, the question of time will be addressed. The second section of the chapter provides a detailed overview of the current accepted ceramic chronologies for Pacific, Caribbean, and Central Nicaragua, also incorporating some data from Costa Rica and Honduras. A detailed discussion of the sampling strategies and archaeological contexts where the sherds were retrieved is included, along with the analytical methodologies applied for classification and characterization, the absolute and relative chronological relationships established, and the archaeometric techniques—when applied—as well as interpretations regarding social complexity and networks of interaction between different regions.[7] Even though this book is based on a bottom-up, local to regional approach, data from the Pacific and Caribbean coasts is presented first because chronological discussions regarding central Nicaragua have historically been closely linked to these areas.

Apart from situating this research within places and times, this chapter aims to provide the background required for acknowledging the necessity of revising the ceramic chronology of central Nicaragua, and possibly of all Southern Central America. In particular, this chapter stresses the necessity of leaving behind typological classifications that are principally based on styles and techniques of decoration. Relative chronology through ceramic association is a powerful tool in archaeological practice, but its use can lead to unreliable narratives of the past.[8] As a result, this chapter also serves as an introduction to inform the reader about the current state of affairs that led to the theoretical and methodological choices discussed in Chapters 3, 4, and 6.

7 The reader will notice that the Caribbean and central Nicaragua sections are extremely exhaustive, in contrast to the Pacific portion, which only provides a brief summary. This imbalance exists because few publications are available for the first two regions, whereas most of these datasets are still in unpublished theses and reports. The Pacific watershed, in contrast, has an ample bibliography that is easily available.

8 See Chapter 3 for a thorough discussion of this issue.

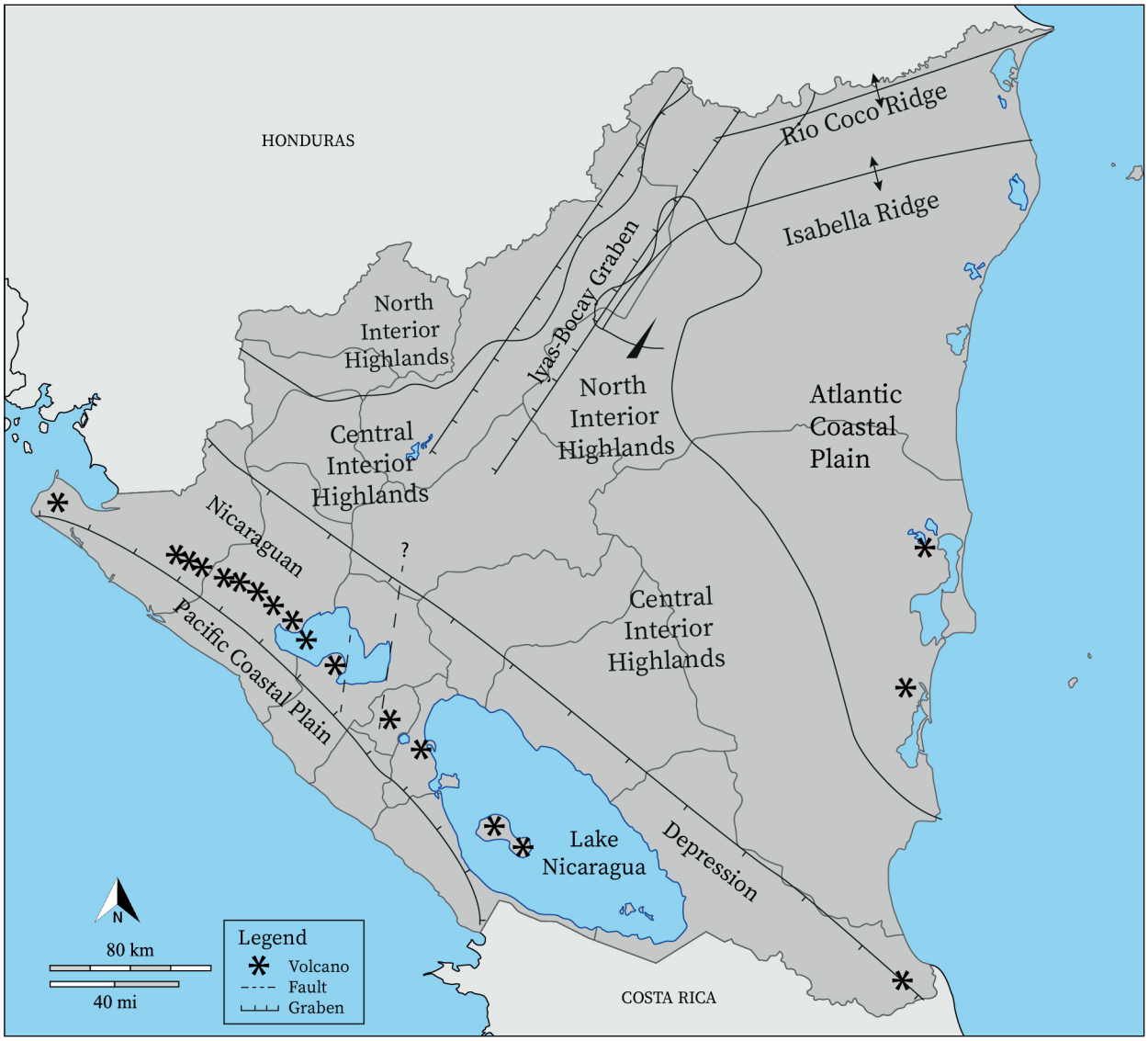


Figure 3: The four physiographic provinces of Nicaragua (redrawn from Arengi & Hodgson 2000, 48).

2.1 NARRATIVES OF PLACE(S)

2.1.1 GEOGRAPHY

Nicaragua (10º 15' 45'' north latitude and 79º 30' 88'' longitude west) is the largest country in Central America, with an area of 130375.87 km2 and a multi-ethnic population of over six million people. To the north, it shares a 530 km border with the Republic of Honduras, and to the south a 313 km border with the Republic of Costa Rica. The eastern limit of the country is the Caribbean Sea, with a 509 km long coastline; the western edge is the 325 km long Pacific coast (Instituto Nacional de Información de Desarrollo 2012).

Nowadays, the country is administratively divided in 15 different departments, two autonomous regions located in the Caribbean coast, and 153 municipalities (Instituto Nacional de Estadísticas y Censos 2006). However, it can be split in four physiographic provinces **(figure 3)**, which coincide with major geologic units: the slopes of the Pacific Coastal Plain, the Nicaraguan Depression, the

Atlantic Coastal Plain, and the Interior Highlands (McBirney & Williams 1965).

The Pacific province can be subdivided into the narrow coastal plain, a sedimentary basin (Morales *et al.* 1993), and the mountain chains of the Cordillera Pacífica and Cordillera Maribios (Rigat 1992), anti-arcs from the Upper Cretaceous through the Tertiary (Kristinsson & Ruíz Mendieta 2012). The Nicaraguan Depression, a 50 km wide graben, is 35-50 m above sea level and extends for more than 500 km from the Caribbean coast of Costa Rica up to the Gulf of Fonseca (Weyl 1980). It includes the rift trenches of Lakes Xolotlán (or Managua) and Cocibolca (or Nicaragua), together with Quaternary alluvial plains located between the Gulf of Fonseca and Lake Xolotlán, on the eastern shore of Lake Cocibolca (Rigat 1992). The Caribbean coast is a marshy coastal strip that features extensive Quaternary alluviums. The Interior Highlands are divided into the Central Interior Highlands and the North Interior Highlands (Hodgson 1988). The former consists of gently rolling to mountainous volcanic deposits dating to the Tertiary period (McBirney & Williams 1965), whereas the latter is comprised of steep mountainous terrain with Paleozoic and Mesozoic rocks (Hodgson 1988). In addition, the Central Interior Highlands consist of four different mountain chains, including the Cordillera Amerrisque. The valley of Juigalpa, part of the Mayales River subbasin and the focus of this research, is situated west of this mountain chain, within the modern department of Chontales.

The department of Chontales **(figure 4)** is located on the northwest coast of Lake Cocibolca, the largest freshwater lake in Central America (Montenegro-Guillén 2003) that connects the Pacific Ocean with the Caribbean Sea via the San Juan river. From pre-conquest times until the 1900s, this route was the most important for transporting people and goods. However, in the 20th century commerce and economic activity shifted towards the western side of the lakes, stressing the isolation of the eastern part of the country (Incer 1976).

The research area of this book is part of Lake Cocibolca's 40000 km^2 basin and features four main physiographic divisions. First, the elevations, located at the foot of the lower Cordillera; then the plains that emerge from the foot of the Cordillera and extend to Lake Cocibolca; the lakeshore and its islands; and finally the drainage, comprised of all the rivers in the department, which discharge in Lake Cocibolca with the exception of the Canas River (Garayar 1972). One of the main rivers within this basin is the Mayales, which forms a subbasin comprised of its permanent water flows, intersected by numerous *quebradas* and minor streams that irrigate the valley of Juigalpa and have likely played a major role in human-environmental interactions since pre-European times. The focus of this research is on the Mayales river subbasin, particularly the valley located north of the modern city of Juigalpa.

2.1.2 GEOLOGY

In spite of the economic relevance of mineral deposits, Nicaragua lacks a complete and detailed geologic map, and the majority of the surveys have been carried out by mining companies and the National Geologic Service (Arengi & Hodgson 2000). Therefore, these geologic studies primarily provide a tectonic and lithologic overview of quartz veins containing gold, since their main aim was assisting in ore prospecting (Mendoza *et al.* 2006). As a result, this section was written taking into account different authors and surveys that focused exclusively on areas with extraction potential.

Gold is the most relevant mineral resource in Nicaragua (Morales *et al.* 1993), and the country's gold fever started in the mid-1800s with the discovery of two mines: the Bonanza and La Libertad-Santo Domingo (Darce 1993). While the first one is situated in the northeast of the country and consists of a mesothermal vein system, the second one was found 35 km northeast of Juigalpa and is an epithermal system (Arengi & Hodgson 2000). In particular, the La Libertad-Santo Domingo gold deposit is one of the oldest (Morales *et al.* 1993) and most productive mining districts in the whole country (Darce 1993). Located "(...) within a broad discontinuous belt of Tertiary volcanic rocks with several epithermal deposits of gold and silver extending from Guatemala (and Mexico) to Costa Rica" (Darce *et al*. 1991, 87), it covers a 154 km^2 area and consists of a system of epithermal quartz veins in NE-SW direction associated to hydrothermally altered Tertiary volcanic rocks (Darce 1987; 1993; Darce *et al.* 1989).

In the 1940s and 1950s, and pushed by dictator Anastasio Somoza García's economic agenda, Nicaragua became the leading producer of gold within Central America and the Caribbean basin. Even though geologists regard this chapter of mining history with certain nostalgia (Arengi & Hodgson 2000), deforestation, chemical waste,

Figure 4: The modern province of Chontales (redrawn and translated from INIDE 2013, 3).

poor working conditions, low salaries, and an unashamed fiscal legislation favoring foreign revenues better describe Somoza's mining policies. The boom of the golden era of gold mining suffered an abrupt interruption in 1979, when the Sandinista revolution nationalized the industry. Later, in 1994, president Violeta Barrios de Chamorro re-privatized all mining endeavors, following neoliberal recipes established by the International Monetary Fund.

Regional Geology

Essentially, Central America is a recent volcanic cordillera that stretches from Guatemala to Panama and is divided in two sections. Nuclear Central America includes the pre-volcanic terrains of Guatemala, Honduras, El Salvador, and Nicaragua, while the nearly entirely volcanic Isthmus of Central America encompasses Costa Rica and Panama (Dengo 1973; Aubouin *et al.* 1982). The isthmus of Central America separates the Caribbean Sea from the Pacific Ocean, as well as terrestrially bridging North and South America (Marshall 2007). The area lies on the southwesternmost end of the Caribbean plate, but it is influenced by four other tectonic plates: North and South America, Cocos, and Nazca (James 2007). The interaction of these plates began with the breakup of Pangea 250 million years ago (Kristinsson & Ruíz Mendieta 2012). The subduction of the Cocos plate into the Caribbean plate has resulted in an active plate margin and the complex structural pattern of Central America's earth crust (Kristinsson & Ruíz Mendieta 2012). In this context, volcanism has been the dominant geologic process since the Tertiary period, continuing into the present (Schmoll *et al.* 1975), and the volcanic arc that forms the backbone of Central America is a consequence of these activities (Nyström *et al.* 1988).

Nicaragua itself represents the southern part of the Chortis Block, which is limited to the northeast by

the Polochi and Motagua faults and by the Hess Escarpment toward the southeast (Kristinsson & Ruíz Mendieta 2012). The country lies on the western edge of the Caribbean plate, bordered by the Cocos and Nazca plates to the north and east and the South American plate to the southeast (Arengi & Hodgson 2000). The country clearly displays the long and complex history of the Cenozoic volcanic province in Central America. With lavas, tuffs, ignimbrites, and volcanic sediments covering almost all of its territory, it has preserved a nearly complete sequence of Late Cretaceous and Tertiary sediment records shaped by volcanic activity and tectonic events (McBirney & Williams 1965). Formations in the region feature relic collapsed volcanic calderas, as well as plateaus with relic conical craters. Ignimbrites with needle shape, massive irregular bodies, pseudo domes and lavas are also found. Hypabyssal rocks feature tabular bodies such as dikes and sills, or massive bodies like stocks (Garayar 1972).

The structural features that have resulted from this complex geological history are divided into three groups, starting with the normal boundary faults of the graben. These feature a northwest-southeast orientation and are possibly associated with the formation of the Nicaraguan Depression, sharing the same orientation. These faults run parallel to the shore of Lake Nicaragua and possibly served as conduits for magmatic emanations. A second fault and fracture pattern with a northeast-southwest orientation transverses the axis of the graben and the main chain of Quaternary volcanoes. Such volcanoes are common near both margins of the graben and within the belt of these volcanoes. Thirdly, there are several fault systems of various ages and orientations that feature broad folding and tilting of rocks adjacent to the depression (McBirney & Williams 1965; Garayar 1972).

Local Geology

As mentioned above, the volcanic activity that has shaped central and southern Nicaragua began during the Cretaceous or Late Jurassic. Volcanism during the Tertiary was concentrated in the Interior Highlands, but evidence suggests that volcanic cones might have existed west of the present coastline since at least part of the Eocene (McBirney & Williams 1965). As a result, there are three volcanic sequences in the region of study: the pre-Matagalpa, Matagalpa, and Coyol (Darce 1987). Additionally, there are five different geological units: the Matagalpa and Coyol groups, undifferentiated volcanic rocks from the Tertiary and the Quaternary, hypabyssal rocks, and Quaternary deposits (Garayar 1972).

The Matagalpa Group (Tomm) is an eroded slope covered by a trellis drainage that was formed from the Late Oligocene to the Middle Miocene **(figure 5)**. Its lithology includes pyroclasts, volcanic sediments, and andesites. In the upper levels of this sequence, welded pink tuff banks of dacitic type are present. The Coyol Group was formed in the Late Miocene through the Late Pliocene, or even the Pleistocene. It was formed by massive bodies and powerful banks of basic volcanic products from Krakatoa-type eruptions and felsitic materials originated by fissural eruptions of *nuée ardente* type, which lie atop the eroded surface of the Matagalpa Group. The lithology of the Coyol group is divided into Lower Coyol (Upper Miocene), which includes agglomerates and andesites (Tmca) as well as tuff and dacitic ignimbrites (Tmcd). The Upper Coyol (Pliocene) features olivine basalt (Tpcb), basaltic agglomerates (Tpca), piroxenic basalts (Tpcb), ignimbrites (Tpci), and basaltic lavas (Tpca). The Tertiary and Quaternary volcanic rocks include undifferentiated lavas and pyroclasts (TQvl). The hypabyssal rocks (Tia. Tii. Tib) date to the Pliocene and consist of isolated bodies, small stocks, sills, or dikes with variable dimensions. The Quaternary deposits are the most recent sediments throughout the region and are comprised of clastic material classified into Alluvial (Qal, rounded materials), Colluvial (Qc, angular materials) or undifferentiated (Q), which are residual dark gray soils associated with the meteorization of basaltic and andesitic fluxes (Garayar 1972; Darce *et al.* 1991; Rigat 1992).

The plateau where the modern city of Juigalpa lies corresponds to the Lower Coyol Group, so basic and intermediate lavas from the Miocene and the Pliocene are common. In contrast, the valley surrounding Juigalpa belongs to the Matagalpa Group, with volcaniclastic rocks from the Oligocene and Miocene and a few outcrops of lavas associated with the Lower Coyol Group (B. Acevedo, pers. comm. 2017).

2.1.3 GEOMORPHOLOGY

The area of study features five different geological and geomorphological units. First, the ancient

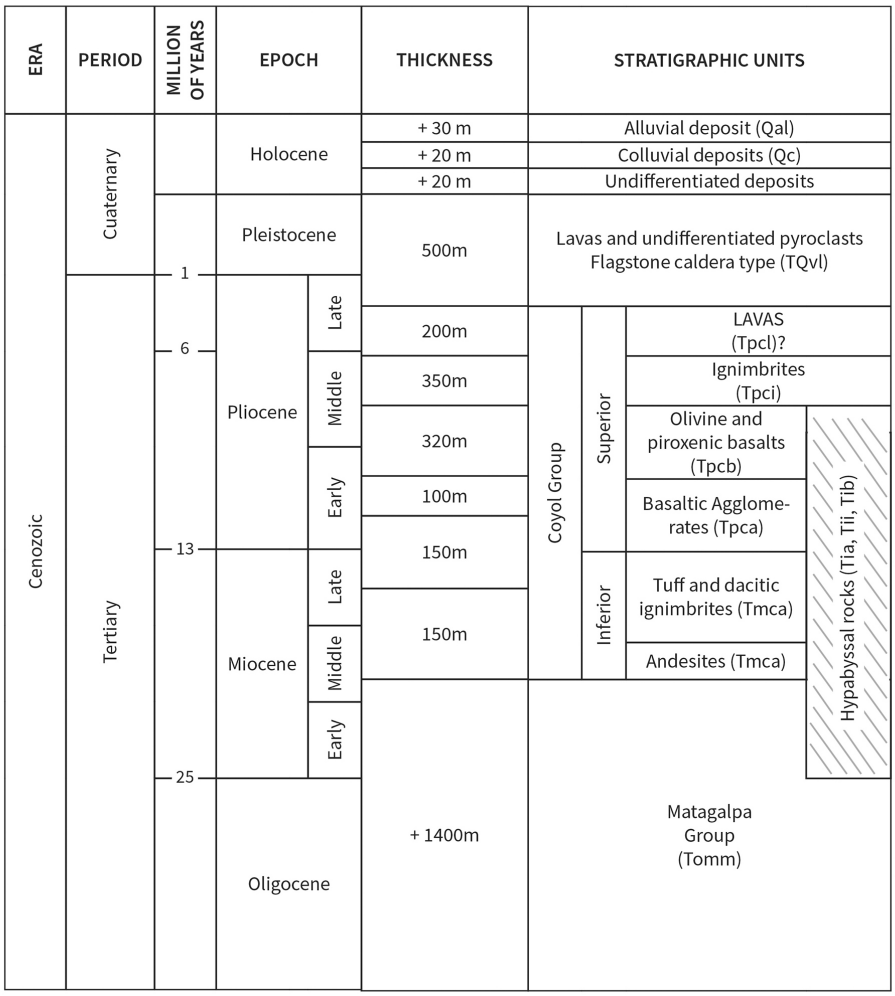


Figure 5: Stratigraphic sequence in the study area (redrawn and translated from Garayar 1972, 16).

slope, formed by Matagalpa Group rocks, consists of isolated hills with a flat top, soft slope, and abrupt end. Second, the rolling hills of Coyol Group and the volcanic rocks from the Tertiary-Quaternary lie atop the surface of the ancient slope. Third, the volcanic plains that are part of the rolling hills feature flat surfaces with soft slopes ending in escarpment that is more than 400 mts high. Hato Grande (Juigalpa) and the Meseta de la Cordillera de Amerrisque (Juigalpa) are good examples of these volcanic plains. Fourth is the lake delta and lakeshore, formed by the deposition of alluvial sediments (Qal) from rivers that discharge in Lake Nicaragua. Due to epeirogenic movements, alluvial plains were formed from divergent rivers, now observable as paleochannels. Fifth are the valleys or erosion plains, present in all four previous units. These valleys feature a dendritic drainage, with profound beds, V sections and steep flanks. As a result, streams tend to be ample and filled with alluvial sediments (Qal, Q), rivers are winding, and plains are extensive with dark clayish soils (vertisoles, locally known as *sonsocuites*). The main valleys in the region are associated with the following rivers: Boaco, Tecolostote, Mayales, Acoyapa, and Oyate (Garayar 1972; Rigat 1992).

When combining geomorphological and topographic features, the research area splits in three different zones (Autoridad Nacional del Agua 2014) **(figure 6)**. First, the high zone, located north of the area, features the Late Tertiary Cordillera Amerrisque (McBirney & Williams 1965), which runs towards

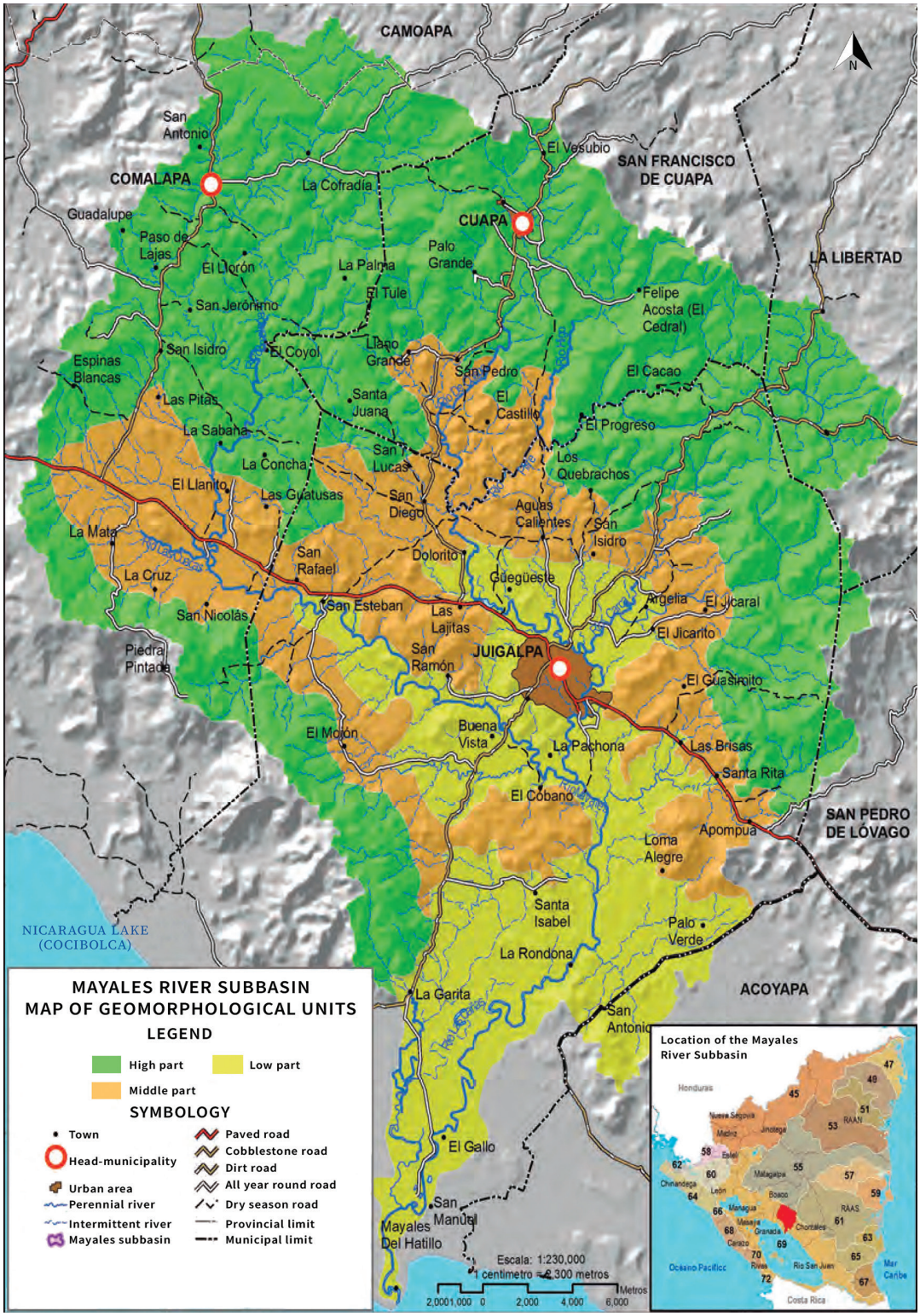


Figure 6: Geomorphological units within the research area (redrawn and translated from Autoridad Nacional del Agua 2014, 29).

Figure 7: Map featuring the Mayales river subbasin (redrawn and translated from Autoridad Nacional del Agua 2014, 24).

the southeast almost parallel to Lake Cocibolca's shore (Taylor 1959; 1963). The mountainous abrupt relief includes elevations up to 800 m.a.s.l. (Obando 1997) and is the cradle for the local rivers (Autoridad Nacional del Agua 2014). The middle zone is characterized by soft slopes, where the middle of the main river courses are located. Finally, the extensive alluvial terraces are located in the inferior course and the Mayales river delta, forming the lowest zone of the subbasin, which has low flat relief (Autoridad Nacional del Agua 2014). The research area is located in the middle zone, which also features some elevations such as the hills of Aguas Calientes, Cerro de la Cruz, and Güegüestepe, for example.

Hydrography

The Mayales river subbasin, with a 1051.72 km2 drainage area, is part of Basin no. 69, which encompasses the San Juan river and the two major lakes of Nicaragua **(figure 7)**. The main river course runs for 83.3 km from its source on the El Parlamento hill (661 m.a.s.l.) until its mouth, at Lake

Cocibolca (Autoridad Nacional del Agua 2014). The river is born in the mountains, crosses the plains and then flows into the lake with a northeast-southwest orientation, perpendicular to the lake depression (Rigat 1992). The subbasin has very good drainage and is divided into six different microbasins: Mayales, Los Cuchumbos, Cuisalá, Apompuá, Las Delicias, and the Lower Mayales. The research area of this project is part of the first microbasin, the Mayales, with a 412.9 square km area and a 42.96 km course (Autoridad Nacional del Agua 2014). The marked seasonal rainfall patterns produce significant variations in river water levels (Taylor 1959; 1963; Rigat 1992), which affects the numerous seasonal streams that cover the area, such as La Garnacha, Aguas Calientes, and Las Ánimas.

Soils

Taylor (1959) identified eight different groups of soils in the research area, whose variation is explained by different climates, parent materials, and topographies. The black tropical soils (grumosols) include the tropical black clays and tropical black clay-loams. These soils are extremely plastic during the rainy season and crack deeply during the dry season. They are usually found on deposits of Quaternary alluvium and on flat areas of Tertiary basic volcanics and sediments. Brown latosols occur both on abundant basic volcanic rocks and on acidic schists. Dark latosols happen mainly on basalt, while yellow latosols are found on almost all types of tertiary volcanic rocks. Lithosols are young, shallow, and stony soils that occur on moderate to very steep slopes. Regosols derive from volcanic ash and consist of immature soils formed on soft rocks or rapidly decomposed deposits. Young alluvial soils are immature and feature successive layers of alluvial deposits. Hydromorphic soils are flooded for long parts of the year, so their main characteristics depend on the duration of this flooding, as well as the groundwater composition.

In contrast, Rigat (1992) defines six pedologic units: brown forest soil, tropical clayish red soil (latosol), unconsolidated clayish rockish soil (lithosol), dark gray-black clayish soil (vertisol), alluvial soil, and hydromorphic soil. Discrepancies with Taylor (1959; 1963) might be due to their different research areas; while Taylor covered the entire department of Chontales, Rigat only focused on the area subject to his archaeological surveys (Gorin & Rigat 1988). Also, it could be the result of different pedological views; while Rigat focused on the links between human populations and their environment, Taylor's classification was strictly geological (A. Geurds, pers. comm. 2019). However, since Rigat does not quote any references in this section, Taylor's definitions will be used.

Van Dijk (2017) conducted an ethnopedological study of local soil knowledge within the research area. According to his study, the local taxonomic system consists of four different levels mainly based on texture and color, in combination with function and land-use variables (van Dijk 2017, 40). The main nine soil types proposed by van Dijk (third level in his taxonomic system) were successfully juxtaposed with seven of Taylor's scientific nomenclatures (van Dijk 2017, 41), creating a comparative baseline between the two classification systems. In this book, both scientific and local names will be applied; however, during excavations, local names were given priority.

Climate and Precipitation

The climate of the research area corresponds to the tropical savanna type, or the AW according to the Köppen classification (Rigat 1992), with an average annual temperature of 25 to 30 °C for the whole region and 26.3 °C in Juigalpa (Garayar 1972). In local classifications, Nicaragua is divided into three climatic zones: hot (0 to 500 m.a.s.l.), temperate (500 to 1000 m.a.s.l.) and cold (1000 to 2107 m.a.s.l.) (MARENA & INFOR 2002); the region under examination belongs to the second zone. The Mayales river subbasin enjoys an average annual precipitation of 1398 mm, with September as the month with the highest rainfall throughout the year (Autoridad Nacional del Agua 2014). Winds flow from the northeast, east, and south (MARENA 2016). There are two different seasons (Taylor 1959): a rainy one from May through December and a dry one from December until April (Garayar 1972). However, the climatic changes due to intense deforestation have resulted in higher temperatures and dryness in general (Rigat 1992), as well as a longer dry season of up to six months.

Flora and Fauna

Nicaragua is split into five different vegetation zones based on climatic conditions: lowland evergreen rain forest, lower montane rain forest, seasonal evergreen rain forest, semi-evergreen rain forest, and

deciduous forest. Apart from that, there are azonal communities, as well as pine forest and savanna. This region of study falls within the semi-evergreen rain forest (Taylor 1963).

Taking into account the geology, topography, climate, soils, and vegetation, the country was split into four different ecological regions. Region I corresponds to the Pacific coast, Region II to the north-central part, Region III with the central Bocay area, and Region IV with the Caribbean coast (MARENA & INFOR 2002). Flora in the region of study (II) is mainly characterized by fabaceous species, represented by shrubs and herbs (MARENA 2016). In general, vegetation fluctuates seasonally and consists of tropical savannas, *jicaral* woods and *zacate jaragua* (grasses) (Garayar 1972). For complete species lists, see Taylor (1963), and the reports by MARENA-INAFOR (2002) and MARENA (2016).

Faunal species are generally divided into terrestrial and aquatic. The first group includes vertebrates such as mammals, amphibians, reptiles, and birds, as well as invertebrates. Rabbits, deer, foxes, porcupines, monkeys, shrews, armadillos, iguanas, snakes, turtles, and several birds are just some of the contemporary native species in this area. The second group live in flooded areas, estuaries, lagoons, rivers, and the Lake. It includes *Parachromis managuensis* (*guapotes*), *Prochilodus lineatus* (*sabalos*), and *Centropomus* sp. (*robalos*), among others. For complete species lists, see the reports by MARENA-INAFOR (2002) and MARENA (2016).

2.2 NARRATIVES OF THE PAST AND PAST NARRATIVES

The question of time and early human presence in Nicaragua has sparked fascination in both national and foreign amateurs, scholars, and politicians, especially in the case of the Acahualinca footprints, which presumably dated to 3000 BCE (Flint 1884; Crawford 1891; Bryan 1973; Schmincke *et al.* 2009). Also, the dubious association of megafauna with jasper flakes at El Bosque, Pueblo Nuevo, Estelí resulted in a visit of several international scholars in the beginning of the 1970s, orchestrated by the government of dictator Anastasio Somoza Debayle (R. Cooke, pers. comm. 2016). However, the confirmed presence of humans in the country starts in the Caribbean watershed (Veloz Maggiolo 1991; Matilló Vila 1993; Balladares Navarro *et al.* 2014b; Byers *et al.* 2014; Roksandic 2014; Roksandic *et al.* 2018).

In Nicaragua, narratives regarding time are mainly centered around the chronology of the Pacific coast (Zambrana Fernández 2015). Hence, it is pertinent to ask ourselves why it is that certain places dominate time narratives. Why does the history of one section of the country define the rest? And why is that portion of the territory so relevant? The answer to that question was partially implied in Chapter 1 and goes back to the impressions painted by early *cronistas* and travelers,[9] in combination with later pioneers and collectors in the 19th century (Steinbrenner 2010, 16-20) through the more formal archaeological attempts of the early 20th century. The narratives stressing connections with "higher" cultures crystallized in 1943, a turning point in the archaeology of Central and North America, when Paul Kirchhoff (1943) included western Nicaragua as part of Mesoamerica, specifically as its southeasternmost border. This proposal dominated the agenda of formal archaeological research in the country for at least five decades and continues to steer many of the current debates. However, new perspectives have argued for the necessity of a paradigm shift (Joyce 2020).

The history of archaeological efforts in Nicaragua since the first ethnohistorical accounts, as well as those provided by travelers and explorers, have been thoroughly examined by numerous authors, such as Healy (1980), Salgado González (1996), Palomar Puebla & Gassiot Ballbè (1999), Tous Mata (2002), Niemel (2003), Werner (2009), Steinbrenner (2011), and Dennett (2016), just to name a few. Gorin (1990; 1992; 2010), van Broekhoven (2002), and van Broekhoven & Geurds (2012) also delved into these topics, with a specific focus on Chontales. In a very broad sense, the authors divide this history into several different periods: early Spanish accounts, which include primary and secondary sources; pioneers and collectors of the 19th century; the first classifications, chronology-building endeavours, and synthesis during the first half of the 20th century; modern systematic archaeology from 1959 through the 1990s; and finally the latest, more bottom-up approaches from the 1990s into the 21st century (Gorin 1990; 2010; Steinbrenner 2010).

9 For examples of these works, see Mártir de Angleria (1944); López de Gómara (1975); Fernández de Oviedo y Valdés (1853); Espinoza (1892); Bobadilla (1998); Benzoni (1962); and López de Velasco (1894).

The efforts centered around ceramic chronology building have been numerous (see below), but in a way they have all followed compartmentalized geo-cultural borders inherited from the discourses described above. Ceramic chronologies in Pacific, Central, and Caribbean Nicaragua reflect dated ideas that consider decoration and morphological styles to be infallible chronological markers. Also, they were specifically designed to assess the level of influences from more "relevant" cultural areas as measured by the presence, absence, and frequency of certain types and styles. Interregional comparisons are reduced to comparative charts that lack real discussions of manufacturing techniques and foodways.

These theoretical biases were translated into methodological ones; the fundamental flaw of ceramic analyses, classifications, and chronological placement in the country lies in the almost absolute negligence towards the "utilitarian" wares,[10] which usually comprise more than 50% of the sample (McCafferty & Steinbrenner 2005a). The focus placed on decorated sherds as the building blocks for chronological narratives is disconnected from the study of social transformations. Chronologies in the country are histories of expanding and declining types and modes of decoration, which do not necessarily reflect the richness and complexity of human experience. The lifeways of ancient Nicaraguans are obscured by a stubborn myopic concentration on the "nice" pots, and no true paradigm shift can take place within this frame of discourse.

2.2.1 CERAMIC CHRONOLOGY OF PACIFIC NICARAGUA

Western or Pacific Nicaragua includes two different geographic and geological provinces: the slopes of the Pacific coastal plain and the Nicaraguan Depression (McBirney & Williams 1965; Schmoll *et al.* 1975). Since early colonial times, this section of the country was selected for the majority of Spanish settlement, so its modern population is mostly comprised of *mestizos*. This area is nowadays home to at least half of the population of the country, in spite of occupying only 15% of the national territory (Instituto Nacional de Información de Desarrollo 2012). Therefore, it is not surprising that this section has received more archaeological attention than the rest of the country combined. Attempts to characterize and chronologically organize the ceramics of the Greater Nicoya area, and consequently of Pacific Nicaragua, started with Lothrop (1926), who was followed by numerous efforts (Norweb 1961, 1962; Coe & Baudez 1961; Baudez & Coe 1962; Baudez & Hogarth 1970; Lange 1971b; Wyckoff 1971; Healy 1974, 1980; Sweeney 1975; Lange *et al.* 1976, 1992; Haberland 1978, 1986; Wyss 1983; Creamer 1983; Day 1984; Hoopes 1987; Abel-Vidor *et al.* 1990; Knowlton 1992; Niemel 2003). The latest attempts to homogenize data were conducted by Vázquez Leiva *et al*. (1994), McCafferty & Steinbrenner (2005), Steinbrenner, (2010), and Dennett (2016). In these efforts, there has always been more data available for Costa Rica, including far more absolute dates, than Nicaragua.

As a result, the current accepted chronology is based on the integration of stratigraphic excavations and radiocarbon dates combined with type-variety and modal analytical methodologies (Healy 1980).[11] The type-variety classification incorporates detailed technological attributes, including thorough paste descriptions, finishing and surface treatment choices, as well as insights into firing techniques and vessel morphometric styles. In practice, iconography and vessel forms have been the markers of origin, identity, and chronology in Pacific Nicaragua (Dennett 2016). Recently, provenance data by means of chemical characterization through Neutron Activation Analyisis (NAA) (Lange & Bishop 1988; Bishop *et al.* 1992; Bishop & Lange 2013; Dennett 2016) and X-RD (McCafferty *et al.* 2007) as well as mineralogical approaches (Dennett *et al.* 2011; Dennett 2016; Platz 2017) have also been integrated. Technological studies regarding fashioning techniques have been conducted in Costa Rica (see Herrera Villalobos 2001 as a good example) but remain scarce in the Nicaraguan

10 Steinbrenner's work (Steinbrenner 2010; 2011) focuses mainly on polychromes but also delves into monochrome ceramics, including utilitarian sherds, trying to establish connections with the decorated ones. His preliminary results point to a shared manufacturing tradition that produced both "utilitarian" and polychrome pots. However, it is unclear how these patterns relate to X-RD results on ceramics from Santa Isabel, which indicate that "(...) the trace minerals found in the monochrome pottery were not found in the polychromes examined" (McCafferty *et al.* 2007, 14).

11 The preceding ceramic sequence included four different periods: Zoned Bichrome (300 BCE - 200 CE), Early Polychrome (200 - 800 CE), Middle Polychrome (800 - 1175 CE) and Late Polychrome (1175 CE - conquest) (Coe & Baudez 1961; Baudez & Coe 1962; Baudez 1967).

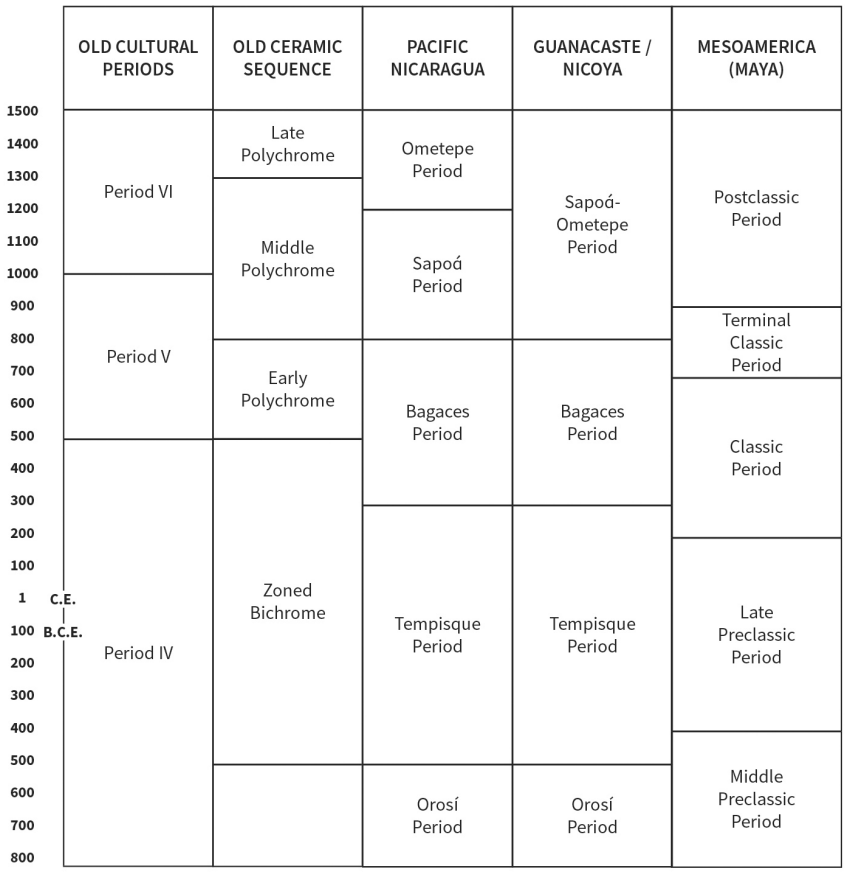


Figure 8: Chronology of Pacific Nicaragua (redrawn from Dennett 2016, 64).

portion of the Greater Nicoya (exceptions are the contributions already mentioned above by Lange, Bishop, and Dennett). The collective efforts made by numerous researchers over more than five decades has resulted in a ceramic sequence comprised of five different phases, based on numerous absolute dates and ceramics, spanning from 2000 BCE until 1550 CE and incorporating predominantly ceramic data, complemented by insights on subsistence strategies, settlement patterns, social organization, contacts with other regions, and stonework traditions (Vázquez Leiva *et al.* 1994). Since available literature is ample and easily accessible, in contrast to the Caribbean and Central portions of the country, the chronology will be briefly summarized **(figure 8)** based on the last published synthesis (Vázquez Leiva *et al.* 1994), incorporating the latest research developments from the Nicaraguan section of the Greater Nicoya (McCafferty & Steinbrenner 2005a; Steinbrenner 2010; Dennett 2016).

Orosí (2000 - 500 BCE)

Ceramics feature decoration with broad incised lines, as well as shell impressions. Red slip, either covering the entire surface of the vessel or restricted to the rims, is also common. The most ubiquitous shapes are *tecomates*, cylindrical vessels, bowls, and globular pots. Lithic technologies include a bifacial flake industry, as well as grinding stones (*metates*). Communities seem to have lived in small hamlets around lagoons, on islands, and in flood areas. Their economy was mixed, including agriculture, hunting, silviculture and the exploitation of lake resources. No evidence of long-distance trade has been recovered (Vázquez Leiva *et al.* 1994).

Diagnostic ceramic types: Bocana Incised Bichrome (Bocana, Toya, Palmar, and Diria varieties), Santiago Appliqué, Schettel Incised, Tronadora Incised, Tonjibe Beige, Tigra Incised Punctuated, Zetillal Shell Stamped, Tajo Incised-Gouged (Vázquez Leiva *et al.* 1994).

Tempisque (500 BCE - 300 CE)
Ceramic vessels go through a transformation in their morphological styles; the period is characterized by the appearance of bottles, *cajetes*, and effigy vessels, both anthropomorphic and zoomorphic. Lithic technologies include flaking industries in local siliceous rocks, polished axes (celts), *metates*, *manos*, hammers and jadeite ornaments. Communities show a certain amount of social differentiation and were located on highly fertile soils and in coastal environments. Agriculture, fishing, hunting, and agroforestry were the main subsistence practices. For this period, there is ample evidence of long-distance exchange of ceramics from the north (Usulután) and central valleys of Costa Rica, as well as of jadeite (Vázquez Leiva *et al.* 1994). The end of this period coincides with the collapse of Mombacho Volcano, which obliterated any evidence for previous settlements on the shore of Lake Cocibolca (Dennett 2016).
Diagnostic ceramic types: Bocana Incised Bichrome (Bocana, Toya, Palmar, and Diria varieties), Rosales Zoned Engraved (Rosales and Claro varieties), Popoyuapa Zoned Striated, Apompua Modelled, Las Palmas Red on Beige, Mojica Impressed (Mojica and Laguna varieties), Monte Cristo Beige, and Beige Brothers (Vázquez Leiva *et al.* 1994).

Bagaces (300 - 800 CE)
Ceramics show a tendency towards less varied, more repetitive morphological patterns, as well as a transition from the zoning of incised and painted designs to polychromy. The Costa Rican sector features linear motifs, both painted and incised; decorative techniques include negative painting, multiple brush, and burnished surfaces. Cylindrical and pear-like shapes are also present. Lithic industries include the appearance of flaked obsidian and other rocks, as well as an increase in the number of *metates*, *manos*, and celts (Vázquez Leiva *et al.* 1994).
This period is characterized by transformations and regional differentiation, with clear variations between northwestern Costa Rica and southwestern Nicaragua in spite of shared traditions. There is an increase in the number of sites, but centralization is lacking in the southern sector. Subsistence practices included agriculture, hunting, fishing, and collection of wild species. Long distance trade also increases, evincing contacts with Caribbean and central Costa Rica, Guatemala and Honduras (obsidian), El Salvador and Honduras (ceramics), and the Maya area (jadeite, slate, and mirror frames) (Vázquez Leiva *et al.* 1994). At the transition between Bagaces and the next period, Sapoá, Dennett (2016) proposes a shift towards more centralized control of ceramic production, distribution, and consumption, evinced by increased standardization, the adoption of new tools, and a decrease in competition.
Diagnostic ceramic types: Guinea Incised (Guinea, Gutiérrez and Resistent varieties), Charco Black on Red (Charco and Puerto varieties), Zelaya Painted (Bicrome and Tricrome varieties), Tola Tricome (López and Tola varieties), Mojica Impressed (Mojica, Corrico, and Arrastrado varieties), Espinoza Red Band, Marbella with Punctuated Zoned Impressions, Las Palmas Red on Beige, Chávez White on Red (Chávez and Punta varieties), León Punctuated, Potosí Appliqué (Caiman, Santos, and Potosí varieties), Velasco Black Bands, Carrillo Polychrome, Galo Polychrome (Jaguar, Lagarto, and Figura varieties) (Vázquez Leiva *et al.* 1994).

Sapoá (800 - 1350 CE)
The beginning of this period was traditionally marked by the arrival of Chorotega speakers (Mangue) to southwestern Nicaragua and northwest Costa Rica. Ceramics feature the popularization of polychrome decoration applied on white slips in the Rivas Isthmus and on orange slips in the Costa Rican section (Vázquez Leiva *et al.* 1994). However, Steinbrenner (2011) considers that "(...) most of the Sapoá Period polychrome types previously identified in Pacific Nicaragua—including those usually treated as markers of different immigrant Mesoamerican groups—are more alike than unalike, and are best understood as the products of a common potting tradition with a probable Central American origin" (Steinbrenner 2011, 1). Therefore, the exogenous origin of the producers of these polychromes is now under debate.
According to Niemel and others (Niemel *et al.* 1998), major settlement pattern transformations took place in south Pacific Nicaragua between 900 and 1000 CE. For example, we see the emergence of the construction of mounds, involving the use of stone slabs and organized around plazas. Several production centers were active during this period in both sectors. Communities show a complex social organization, with subsistence practices including a mix of agriculture, fishing, hunting and collection. Long distance trade included relationships with

Honduras, as evinced through presence of imported ceramics, metallurgy, and marble vessels; with Guatemala, as shown by obsidian finds; and elsewhere in Mesoamerica, expressed through iconographic traits identified in local ceramics. From a technical point of view, Mesoamerican influence is evinced by the application of finer surface treatments, including more advanced smoothing techniques and better distributed slips (Niemel *et al.* 1998). Obsidian frequencies are higher in the north than in the south, but both sections experienced an increase in the production of prismatic blades and flakes (Valerio Lobo & Salgado González 2000). The rest of the lithic industries show continuity with previous periods, with the presence of *metates* (both carved and uncarved), nutcrackers (recycled *metates*), unworked flakes, projectile points, grinders, polishers, axes (both flaked and polished) (Vázquez Leiva *et al.* 1994). Also, worked bone artifacts are present, particularly ornaments, needles, flutes, sharp splinters, and points. Shell artifacts are also present, usually used as ornaments (Vázquez Leiva *et al.* 1994).

Diagnostic ceramic types: Mora Polychrome (Mora, Guapote, Mono, Guabal, Cinta, and Chircot varieties), Papagayo Polychrome (Papagayo, Culebra, Mandador, Serpiente, Fonseca, Pica, Alfredo, Cervantes, Césares, and Manta varieties), Birmania Polychrome, Cabuyal Polychrome, Palmira Polychrome, Sacasa Striated, Guillén Black on Light Brown, Santa Marta Polychrome, Altiplano Polychrome, Belén Incised (Palmares, Belén, and Ayotes varieties), Asientillo Polychrome, Pataky Polychrome (Leyenda, Mayer, and Pataky varieties), Jicote polychrome (Pataky, Jicote, Tempisque, Máscara, Lazo, Madeira, Felino, Luna, Lunita, Bramadero, and Cara varieties), Grandad polychrome, Jiménez Polychrome, Piches Red, Danta Beige, and Tres Esquinas Beige (Vázquez Leiva *et al.* 1994).

Diagnostic types of Late Sapoá - transition to Ometepe: Vallejo Polychrome (Vallejo, Lazo, Cara, and Mombacho varieties), Madeira Polychrome, and Bramadero Polychrome (McCafferty & Steinbrenner 2005a).

Ometepe (1350 - 1550 CE)

This period is marked by the supposed arrival of the Nicarao groups, who were Nahuatl speakers, and the Subtiabas (but see McCafferty & Steinbrenner 2005a and Steinbrenner 2010). Communities, which show increased hierarchization, continue living in the same sites, and continuity is also visible in their subsistence practices. Ceramics evince consistency with the types that appear at the end of the Sapoá period, such as Vallejo Polychrome and its varieties. New types are also present in the assemblages, such as Luna Polychrome and Murillo Appliqué. Lithic industries feature more diversity. Obsidian frequencies reach new highs, especially in the Lake Xolotlán basin, and bifaces produced with local raw materials are on the increase in this period. Stone sculpture also originates within this period (Vázquez Leiva *et al.* 1994).

Diagnostic ceramic types: Castillo Engraved, Banda Polychrome, Luna Polychrome (Luna and Menco varieties), Cuello Appliqué, Murillo Appliqué, Lago Negro Modelled, Ometepe Red Slip, Patastule Red Bands, Carlitos Polychrome, Miragua Comun, Coronado Red, Oluma White and Red (Vázquez Leiva *et al.* 1994).

The chronology summarized above requires critical assessment. For the Nicaraguan section, more radiocarbon dates are necessary in order to elucidate the actual temporal placement of the sites and therefore of the ceramics retrieved from them. Also, as noted by McCafferty & Steinbrenner (2005), traditional views of Greater Nicoya equated ceramic types with cultural groups. Therefore, the appearance of certain types was thought to signify the arrival of different communities. However, a lack of solid material connections with the supposed migrant groups, together with local continuity and a refinement of the chronology, have questioned these assumptions (McCafferty & Steinbrenner 2005a). Methodologically speaking, this bias towards migrations has resulted in a virtual absence of inter-type continuity approaches, as previously noted by Steinbrenner (2011). As a consequence, types have been conceived as autonomous units that serve as ethnic markers. For example, Papagayo Polychrome and Sacasa Striated have traditionally been ascribed as Chorotega diagnostics, while Vallejo Polychrome would be a Nicarao product. However, a modal approach focused on looking at the connections between the types, at their similarities rather than their differences, proposes that they were products of shared potting traditions (Steinbrenner 2010; 2011).[12]

12 The conceptual modes taken into account included vessel form, appendage and decorative modes, wall thickness and height, mouth diameter, etc. (Steinbrenner 2010; 2011).

Ceramic analysis in Greater Nicoya is far from integrating true technological variables. Even though Dennett's (2016) work and partially Steinbrenner's (2010) do delve into technological choices, the first study is limited to clay procurement and clay preparation practices, while the second focuses on formal aspects that can be byproducts of technological choices. Therefore, these modes are not examined from a true technological perspective. For example, Steinbrenner (2010; 2011) is convinced that average wall thicknesses of different types are "unconscious" or "unintentional" attributes. However, direct relationships can be established between wall thickness and choices related to fashioning techniques, including coil size and the type of force applied to the pre-form (pressure or percussion). Therefore, these conceptual modes, or formal attributes, can be directly linked to socially learnt practices and are not necessarily random results. From a practice theory perspective, some modes are unintended consequences of situated, learnt bodily gestures in different steps of the manufacturing chain. Modes related to wall thickness, for example, may also be related to certain properties desired for the end product in connection to consumption practices.

2.2.2 CERAMIC CHRONOLOGY OF CARIBBEAN NICARAGUA

The Caribbean (Atlantic coast) region of Nicaragua comprises 60366 sq km (INETER 2000), almost 50% of the national territory (Programa de Naciones Unidas Para el Desarrollo 2005). Geologically, it was formed by a magmatic sedimentary succession comprised of Miocene to Upper Quaternary (Holocene) deposits atop an earlier Tertiary substrate (Kristinsson & Ruíz Mendieta 2012). Geomorphologically, the Caribbean coast of Nicaragua is an extensive plain that features some elevations up to 1650 m.a.s.l. (MARENA 2000b), but is mainly a flat terrain crossed by rich hydrological networks (for example Río Grande de Matagalpa, as well as the Escondido and Prinzapolka rivers). The climate is characterized as tropical humid, with high precipitation and a stable temperature of 27 °C. It features an environment of tropical wet forests, wetlands, marshes, mangroves, and swamps (MARENA 2000a).[13] Administratively, it is divided into two autonomous regions: Región Autónoma de la Costa Caribe Sur (RACCS) and Región Autónoma de la Costa Caribe Norte (RACCN). In the past, the former was known as Región Autónoma del Atlántico Sur (RAAS) and the latter as Región Autónoma del Atlántico Norte (RAAN). Nowadays, these two regions are home to very diverse groups: indigenous, such as the Miskito, Mayagna, and Rama; the Afro-descendent Garifuna and Creole communities; and the *mestizo* community, who are the majority (Williamson Cuthbert & Fonseca Duarte 2007).

Before the 1970s, knowledge regarding the pre-Hispanic Caribbean population in Nicaragua was limited to ethnohistoric accounts by travelers (Squier 1891; Hodgson 1990; Roach 1991; Romero Vargas 1995; Íncer Barquero 2003; von Houwald & Castro Frenzel 2003), which characterized the population as small groups with high mobility who mainly subsisted through hunting, fishing, and gathering practices but also developed incipient agriculture. However, in the 1970s, two major research events transformed our understanding of this region. First, Jorge Espinosa, together with foreign colleagues, conducted an archaeological survey that resulted in the identification of 15 different shell middens at Monkey Point (RACCS) (Matilló Vila 1993), as well as excavations at the Angie shell midden (Veloz Maggiolo 1991; Matilló Vila 1993). The absence of ceramics in this context led to the hypothesis that it was at least 7600 years old (Magnus 1974).[14] Radiocarbon dating of the deposit established its age as 7065 ±734 (71-194) BP and 6915 ±235 (71-203) BP (Veloz Maggiolo 1991, 38). Human remains of a 25-40 year-old female (Roksandic 2014; Roksandic *et al.* 2018) were found directly atop a radiocarbon-dated context (Gaitán Solano & Balladares Navarro 2012; Balladares Navarro *et al.* 2014a; Byers *et al.* 2014). A brief description of the materials retrieved account for the presence of ceramics within only the upper 30 cm of the shell midden, which were followed by deposits containing hearths, floor levels, lithic artifacts, sea and freshwater shells,

13 Unfortunately, extensive agriculture has damaged these ecosystems (MARENA 2000a).

14 Recent excavations led by archaeologists from BICU-CIDCA and the CADI (UNAN-Managua) yielded radiocarbon dates confirming that the site of Angie is more than 6000 years old (Balladares Navarro *et al.* 2014b; Byers *et al.* 2014). Since all samples were taken from around 3.5 m in depth, and the estimated total depth of the midden is 7 m, the currently accepted hypothesis proposes that the antiquity of the midden will probably surpass Espinosa's projections (Balladares Navarro *et al.* 2014b).

shark and other fish remains (bones and teeth), as well as mammal remains (Veloz Maggiolo 1991). More recent excavations confirmed the presence of ceramics within the first three stratigraphic levels, up to 64 cm below the surface (Byers *et al.* 2014). These sherds were monochrome, but one incised sample was collected, identified as the type Lower Lagoon Fine Lined Incised (800 - 1200 CE according to Magnus' chronology) (Byers *et al.* 2014). Lithic industries, which were not based on flaking techniques, included choppers, suggesting large woodwork, which could indicate the production of canoes used for transport and fishing. Hammers and *manos* indicate seed processing (Veloz Maggiolo 1991). Even though full results were not published, the hypothesis generated by this preliminary research insisted that the Caribbean coast of Nicaragua was populated in a much denser manner than previously stipulated; that its original dwellers came from the south; and that this territory served as a link to the Greater Antilles (Matilló Vila 1993).[15]

Following these lines of thought, Richard Magnus (Magnus 1974; 1978; 1980a; 1993) started his research plan between the north end of Pearl Lagoon and the south end of the Bluefields Bay. In his opinion, ethnohistorical accounts were inaccurate because they described communities already transformed by the European invasion, such as the Miskito, who were riverine people and then adapted to the sea coast after the arrival of the invaders (Magnus 1974; 1993). For that reason, his study included survey and excavations (mainly but not exclusively of shell middens), as well as a cultural chronology based on a ceramic sequence constructed using "(...) a combination of frequency and similiary seriation of ceramic modes, synchronization, and radiocarbon dating" (Magnus 1974, I). His analytical methodology included types and modes, as well as the definition of traditions and their complexes. Results obtained through these combined methodologies resulted in a chronological proposal spanning from 400 BCE until 1400 CE and comprised of two different ceramic traditions **(figure 9)**.

The first ceramic tradition, Siteioid, includes a single ceramic complex, while the second, Smalloid, encompasses three different ceramic complexes (Magnus 1974; 1980a). All coastal sites excavated by Magnus consisted of temporary hunting and

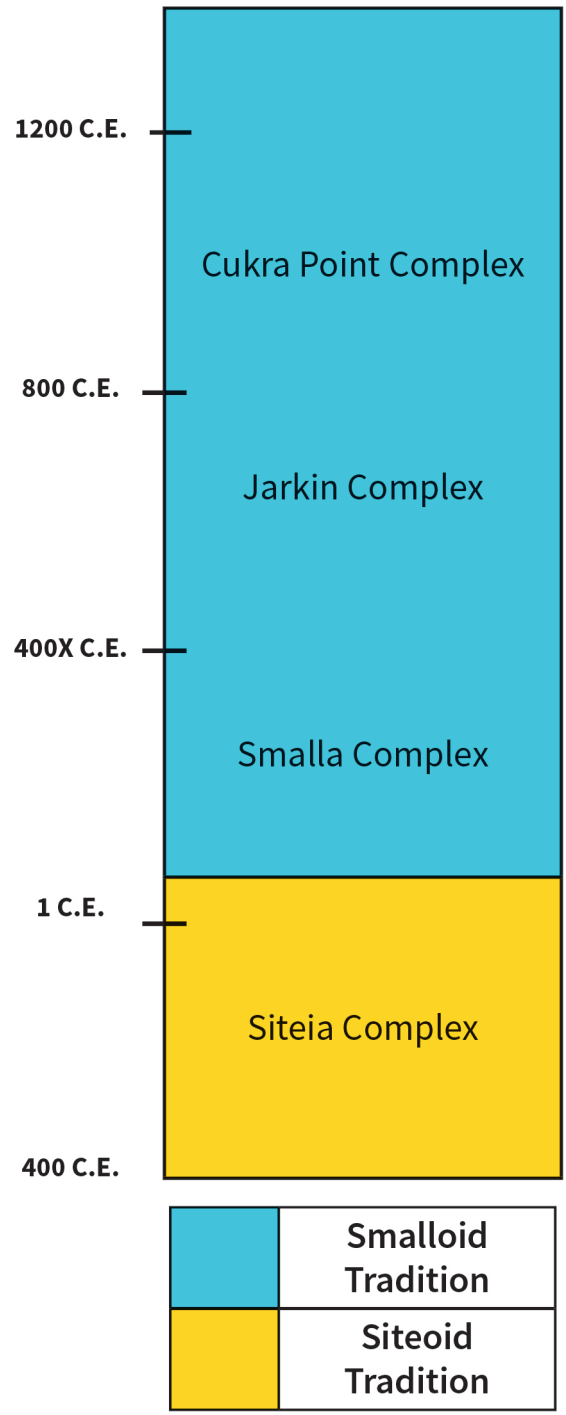


Figure 9: Chronology of Caribbean Nicaragua according to Magnus (redrawn from Magnus 1974, 204).

15 This connection to the Caribbean islands was previously proposed by Cruxent and Rouse (1969).

fishing stations used by inland-based agriculturally oriented riverine groups, who visited the coast to complement their diet. In his opinion, the coast was not significantly populated until after the conquest, suggesting a continuity in ancient subsistence practices that was disrupted by the conquest and the modern tendency towards permanent villages along the coast (Magnus 1978).

Siteioid Tradition (400 BCE - 1 CE)

The earliest and only complex within this tradition, Siteia, was defined through the excavation of three archaeological sites: Cox, Cayasso, and Siteia, all located along the southern Miskito coast, between the north end of Pearl Lagoon and the south end of Bluefields Bay. These sites were comprised of one or several shell middens and belonged to the site category of ceramic highland lagoon, according to Magnus's classification.

Archaeological excavations yielded 5100 ceramic fragments, which were classified into 11 different types. One of these types, Pearl Lagoon Polychrome (red and black on white), was characterized by its polychromy; however, the majority of the sherds were monochrome, thick, red slipped and without any further decorations. Paste recipes were homogeneous, and grain sizes were all fine or very fine with sand or white grit temper, which resulted in compact sherds. Smoothing was performed by hand or with the help of a pebble; incised decorations were present. Surface treatment involved polishing with a pebble and slipping in predominantly red tones but also in black, while decoration consisted of different painting techniques. This included rectilinear wide bands in red and black and white circles in negative paint with black dots in the center. Additionally, Magnus (1974) characterized a "sun" motif, comprised of a circle with perpendicular lines around the circumference. Firing possibly took place in an open oxidizing atmosphere, with good control over temperature and duration.

Other objects associated with this complex are stone celts and unmodified but used flint chips measuring 3x3x4 cm, interpreted as animal skinning tools. *Metate* and *mano* (ovoid cross- section) fragments were also present and assumed to have been employed for maize processing. Additionally, 2-3 cm rhyolite stone balls were presumably used as fishing weights. A bone projectile point was found, along with bone fragments from mammals, reptiles, and fish.

Magnus found possible similarities between his polychromes and those found at Caño del Oso in southern Venezuela, so he attributed a South American origin to the tradition, which was possibly brought to Nicaragua by small groups of people who either moved all the way North or made regular short trips to the area. Apart from that, the presence of a single Zoned Bichrome sherd suggested to Magnus a minimal contact with the Greater Nicoya and/or Western Lake Nicaragua.

Two radiocarbon dates were obtained to date this tradition. The earliest sample dated to 25 BCE (I-7100) and consisted of a charcoal fragment, which was found at the Siteia site, Cut 1 (100-120 cm deep) among the shells forming the midden and in association to painted ceramics. The second sample, a shell fragment associated to painted ceramics, dated to 80 CE (I-7450).

Smalloid Tradition (1 - 1400 CE)

The Smalloid tradition was defined through the excavation of ten different archaeological sites, which resulted in the definition of three diachronic complexes, characterized by the absence of polychrome and the presence of monochrome undecorated types, as well as incised ceramic modes such as groups of short, parallel lines that were either widely spaced over the surface of the vessel or close to each other, forming textile-patterning as well as punctuation, in combination with a lack of modelling techniques.[16]

Smalla Complex (1 - 400 CE)

The Smalla Complex was excavated at a single archaeological site, Smalla, located at the north of Pearl Lagoon. The site was comprised of one shell midden and belonged to the site category of ceramic highland lagoon, according to Magnus' classification.

16 Martínez Somarriba (1977) excavated Tacanites and Laureles, in Nueva Guinea, the geographical transition between the Caribbean coast and the Central Interior Highlands. Together with his supervisor (Magnus), he aimed to explore cultural boundaries between these two regions. As part of his results, Martínez Somarriba created the Nueva Guinea complex, which he placed within the Smalloid Tradition (Martínez Somarriba 1977; Magnus 1980a). Since his description of the ceramic analysis is not thorough, a re-evaluation of the materials was conducted by Miranda Tapia (2014), who proposed that the ceramics from Tacanites and Laureles actually should be placed within the Siteia Complex (Miranda Tapia 2014, 66). Since this debate exceeds the limits of this section's aims, the Nueva Guinea Complex was left out of the summary of Magnus' chronological proposal.

Abundant materials were recovered, such as zooarchaeological remains (turtle, peccary, manatee, and fish, flint flakes), and ceramics. The 2050 sherds were classified into 17 different types, of which five were also present in the Siteia Tradition. Paste recipes were homogeneous, featuring only white grit tempering (in contrast to the previous presence of both white grit and sand) and a more varied spectrum regarding grain size (fine, medium, and coarse) when compared with the previous tradition. However, the majority of the types show a tendency towards fine pastes, which implies a certain continuation in preferences related to clay procurement and/or preparation practices. Finishing included smoothing, but not many details were provided by Magnus to enable technological interpretations. Decorations were characterized by the combination of incisions on thick bands and punctuation, as well as incised lines with punctuation. Red slip with punctuation was also present, as well as non-slipped undecorated monochrome ceramics. No appendages were identified in this assemblage. As in the previous complex, firing possibly took place in an open oxidizing atmosphere, with good control over temperature and duration; however, firing technique involved lower temperatures and/or a shorter duration. Some fragments featured smoked internal surfaces. Other objects associated to this complex were a large number of unworked but used 2x3x1 cm flint chips, as well as *mano* (cross-ovoid section) and *metate* fragments. Additionally, zooarchaeological remains, such as bone fragments of white-lipped peccary, brocket deer, hickatee turtle, manatee, and various fishes (jack, snook, coppermouth, etc.), were found.

Magnus did not identify connections between the types defined for this complex and other regions; only some vague similarities were observed with the Dinarte phase of Ometepe. However, Magnus established links between the unclassified polychrome pottery (black and white on red) he excavated and the Central Interior Highlands of Nicaragua. As a result, the author proposed that "(...) during the Smalla complex times, the Miskito Coast inhabitants were very isolated and very uninvolved in extensive trade with other zones. Possibly other peoples passed through the zone but apparently had little influence on the local culture" (Magnus 1974, 212). Since the bone and shell was too badly eroded, no radiocarbon dates were obtained for this complex. Synchronization was not possible due to the lack of imported artifacts. Consequently, its chronological placement was established through similiary and frequency seriation of modes within the Smalloid Tradition.

Jarkin Complex (400 - 800 CE)

The Jarkin Complex was excavated from four different archaeological sites. Three of them, Jarkin, Finca Jarkin, and Jarkin Cana, were located in the Cukra Hill vicinity and belong to the site category of ceramic riverine sites, according to Magnus's classification. The fourth site, a shell midden known as Long Mangrove, was classified as a ceramic lowland-lagoon site and was situated south of Brown Bank. A total of 5700 sherds were classified into ten different types, none of them present in any of the previous complexes.

Paste recipes show a clear discontinuity with preceding clay procurement and/or preparation practices, with more than half of the types featuring a tendency towards medium grain sizes and the presence of two coarse types, a grain size completely absent in the previous complex. Tempering also shows transformations towards more heterogeneity, featuring five types with sand (mostly quartz), four sites with white grit, and one with sand (quartz) combined with shells. Coarse ceramics were sand tempered, while medium fine ceramics had either sand or white grit, with the exception of one case (Chavarria B) with sand and shell. Fine ceramics only contained white grit temper. Very little data is provided for finishing, but surface treatment involved polishing with a pebble and slipping. Most ceramics were undecorated and monochrome, usually unslipped. However, decoration techniques show several innovations, such as appliqué decorations (bands and zoomorphic) and supports (zoomorphic and small conical). Incised modes continue in this complex but show more complexity, such as intricate textile patterns created with incised lines and punctuations. A tendency towards flattened rim tops is also developed during this complex. A metric analysis of Magnus' drawings indicates a reduction of vessel wall thickness. Firing techniques seem to be twofold. Some types show evidence of continuity with the preceding complexes, with open oxidizing atmospheres with good control over firing temperature and duration. In contrast, other types evinced the introduction of a new technique, firing in controlled closed atmospheres, which could imply the use of a kiln. Objects found in association with these ceramics were unmodified but used 2x3x1 cm flint chips, as well as *metates* and *manos* (ovoid cross-section), also found in miniature. According

to Magnus, the smaller ground stone artifacts were employed for grinding chillies or other condiments. No zooarchaeological remains were recovered in any of the sites within this complex.

One of the ceramic types, Heizen Incised Line and Punctuate, showed stylistical continuation with two types from the former Smalla complex, allowing for intra-zone comparisons. Also, Heizen featured similarities with the Dinarte materials from Ometepe; however, this phase is earlier than the Caribbean materials, so relationships are tenuous. Even though Magnus tried to draw comparisons to other complexes from southern Central America, Belize, and northern South America, he concluded that the relative isolation of the Miskito coast during the Jarkin complex times was similar to the previous complexes. Sporadic contact with surrounding regions cannot be excluded, but cultural innovations seem to emerge locally.

One radiocarbon date was obtained for this complex, which yielded a date of 490 CE. The sample consisted of large lumps of charcoal, which were found at the Jarkin Cana site, Cut 4 (75-100 cm deep). This represents the first radiocarbon date for earthen mounds in Caribbean Nicaragua.

Cukra Point Complex (800 - 1200 CE)

The Cukra Point Complex was excavated at five different archaeological sites comprised of shell mounds throughout Bluefields Bay. Four sites (Cukra Point, Pilly Point, Paraiso, and Thomas Finca) were classified as ceramic highland lagoon sites, while Mullin Creek belongs to the ceramic lowland lagoon site category. A total of 7250 sherds were classified into 23 different types, with only two types (Lower Lagoon Fine Line Incised and Lower Lagoon Medium Line Incised) previously defined for the Siteia tradition and complex.

Paste recipes are extremely homogeneous, only featuring white grit temper, like the Smalla Complex. Grain size is predominantly medium-fine, followed in frequency by fine, very fine, coarse and medium types. This variability is shared with the other complexes within the Smalloid Tradition and contrasts with the Siteoid Tradition. The only finishing technique reported was smoothing with a pebble, while surface treatment involved slipping in red and white. Incised decoration techniques and styles reach their most complex forms, with more systematic patterns for placing groups of lines and dashes, creating definite textile patterns. Also, there is a varied range of appliqué ornamentation that seems to relate to the Jarking Complex, now featuring snakes and other animals, as well as banding. The number of vessel supports increases when compared to the previous complex and includes conical, geometric, cylindrical, zoomorphic, and anthropomorphic shapes, some of which feature incised lines and appliqué dots. Additionally, the tendency towards flat top rims is stressed. Two types featured smoked surfaces, on interior (Eugene Plain Black Interior) and exterior (Allen Plain Black Exterior) surfaces. As in the Siteioid and Smalla Traditions, firing possibly took place in an open oxidizing atmosphere, with good control over firing temperature and duration.

The objects found in association with the ceramics consisted of 2x3x2 cm average size unworked but used flint chips; *metate* and *mano* (ovoid cross-section) fragments, both in average and miniature sizes; stone balls; and stone celts. Additionally, zooarchaeological remains, such as mammals, reptiles, and fish, were found.

Magnus identified some possible stylistical relationships between the Cukra Point Complex and other regions, but connections were drawn mostly with the Jarkin Complex, suggesting continuity of the local tradition. Therefore, he concludes that, as in the previous complexes, the research area remained relatively isolated and developed its own cultural traits locally. Some minimal trade might have occurred with Northern South America, but those links are very tentative. Sporadic trade with the Greater Nicoya or Western Lake Nicaragua was evinced by the presence of a single polychrome jaguar vessel support.

One radiocarbon date was obtained to date this complex, which yielded 1185 CE. The sample consisted of shell fragments, which were found at Cukra Point, Cut 6 (40-60 cm deep). This date represents the most recent for prehistoric occupation of the research area.

Magnus' work is exemplary because even though it is limited to the theoretical (ecological-cultural approach), methodological (typology, modal analysis, seriation), technical (dating, macro and microbotanical sampling, for example) and natural (the 1972 earthquake) constraints of his time, he excelled in describing his complete sampling strategies, from site selection criteria for excavations, through digging techniques, as well as his analytical choices in the laboratory. However, his research has several limitations. To begin with, he argued that none of the surveyed sites were multi-component (Magnus 1974) but rather were occupied for around 50 years

(Magnus 1978). Therefore, cultural stratigraphy was not suitable for answering his cultural chronology question (Magnus 1974, 186). In his opinion, "(...) statistical studies of frequencies from level to level inside a single site did not yield meaningful results" (Magnus 1974, 185). However, stratigraphic analysis goes beyond temporal placements, as it aids in broader interpretations about the excavated contexts (Harris 1991). Problematic as well regarding sampling are his excavations of earthen mounded sites, such as Jarkin, where test pits were only placed directly on structures, retrieving materials used as filling, without collecting comparative off-mound excavation data.

In regards to his analytical choices, his definition of types was mainly based on modes related to the outer appearance of sherds, such as surface color, luster, and surface decoration. Also, he included some technological variables, like hardness and temper, as well as wall thickness, as metric characteristics. Nevertheless, paste descriptions were not exhaustive and did not include archaeometric techniques, and modal analysis of rims and morphostyles was only partially undertaken. Moreover, even though some "plain" ceramic types were unique to each of the complexes, he chose not to include them because he considered that their defining modes were sensitive to local variables such as fuel and raw material availability (Magnus 1974, 188). Even though these factors play fundamental roles that affect both internal and outer appearance of ceramics, as well as technological choices, they do not necessarily impact all steps of the manufacturing process, nor the pots' morphometric styles.

Additionally, the limited number of radiocarbon dates (n=4) was solely obtained to confirm the results of his seriations. Only three of the four complexes were dated, and only one of them has two dates (Siteia), while the rest rely on a single radiocarbon date. The Smalla Complex, which lacks absolute dating, was placed in the chronology solely based on seriation criteria, which has its own issues. Magnus applied a reductionist evolutionary principle in constructing his similiary seriation, which went from simple to complex and from absence to presence. As a result, for example, he organized the incised modes considering that the ones featured in the Siteia Complex were less developed than in the Cukra Hill Complex. Also, the occurence of certain modes, like appendages or supports, was arranged from none to few to higher frequencies. The assumption that everything tends to go from simple to complex, and from none to lots, implies a teleological, evolutionary notion of culture. Finally, there is one detail in Magnus' work that escapes my understanding. Since the author included synchronization as part of his analytical methodology, throughout his work he compared the modes present in the ceramics he excavated with those from other assemblages. Therefore, references to ceramics from Belize, Honduras, Costa Rica, Panama, Colombia, and Venezuela are abundant in his text. However, he made absolutely no comparisons with the insular Caribbean. This is particularly striking considering that his dissertation supervisor at Yale University was professor Irving Rouse, who was foundational in the design and application of modal analysis in the Americas with his own doctoral work in Haiti (Rouse 1941) and then throughout his career in both the Lesser and Greater Antilles. The reason behind this omission could be Rouse's animosity towards Steward's Circum-Caribbean postulate. Also, Rouse did not consider materials from Caribbean Nicaragua to be similar enough to the Antillean ones to allow comparisons, and Magnus was more inclined towards local developments rather than assertions of long-distance movement (A. Geurds, pers. comm. 2019).

After Magnus concluded his seminal work in Caribbean Nicaragua, the country went through a complex political phase, which included the Sandinista revolution, the dismantlement of Somoza's regime, civil war, and attempts to establish a revolutionary government. Perhaps due to this, research in the area was scarce until 1998, when the Universidad Nacional Autónoma de Nicaragua (UNAN-Managua) and Universitat Autónoma de Barcelona started a collaborative research project focused on the localization and re-evaluation of archaeological localities in the RACCS, specifically between the northern half of the Bluefields Bay and Kakabila Point. This project aimed to re-define Magnus' existing chronology from a different standpoint. Apart from taking into account material culture, as in any traditional chronology building effort, they decided to propose a chronological sequence showing the changes in ceramic and lithic production alongside environmental exploitation strategies (Gassiot Ballbè & Palomar Puebla 2006).

This international multidisciplinary research program involved explicit survey and excavation methodologies, with multiple publications and theses ranging from ceramics (Latino Muñoz & Palomar Puebla 2005; Gassiot Ballbè & Palomar Puebla 2006; Vásquez Moreno 2016), lithics (Gutierrez Torres 2007; Clemente Conte *et al.* 2008), malacology

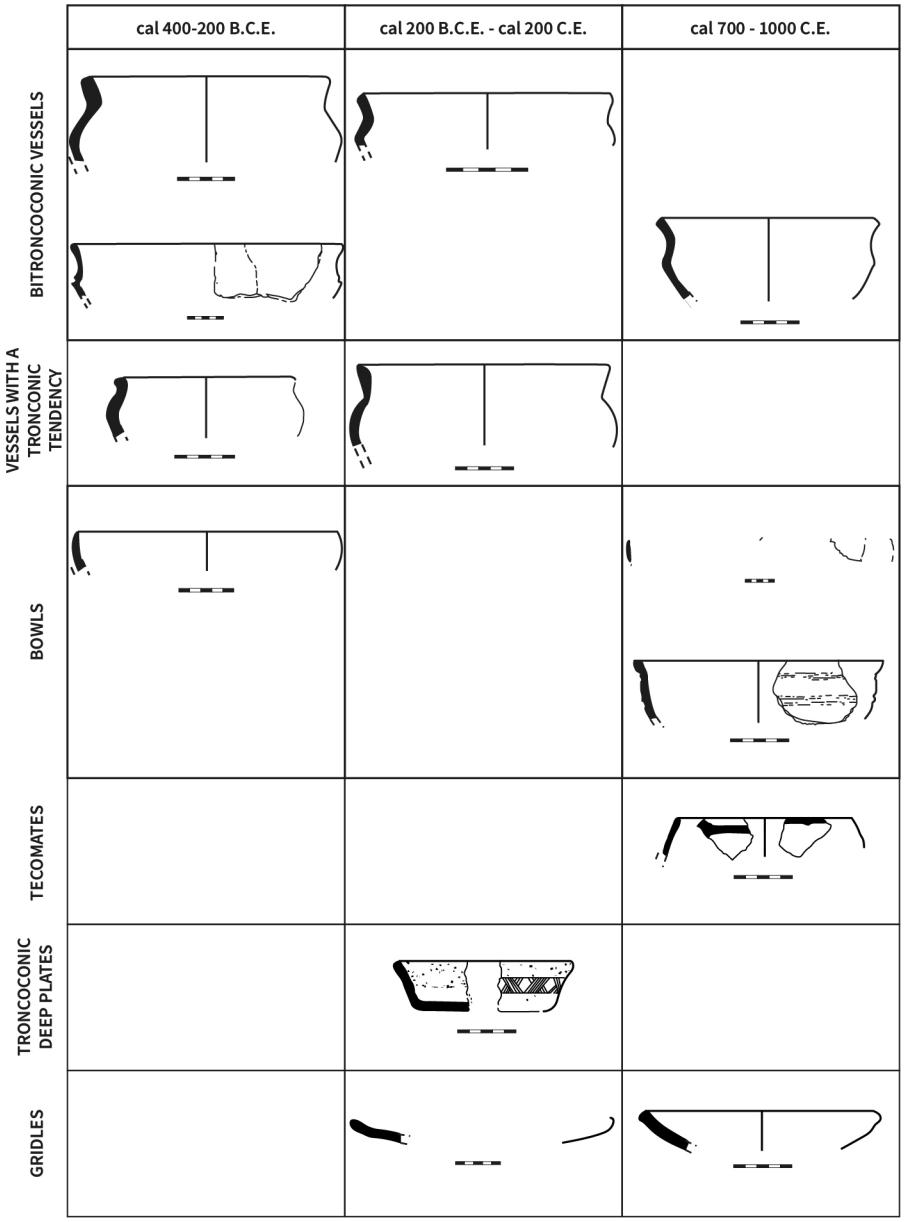


Figure 10: Chronology of Caribbean Nicaragua according to Gassiot Ballbé and Palomar Puebla (redrawn from Gassiot Ballbè & Palomar Puebla 2006, 237).

(Gassiot-Ballbè 2005; Gassiot-Ballbè & Clemente Conte 2015), and zooarchaeology (Lara Kraudy 2004; Zorro Luján 2010; Delsol *et al.* 2015), to social complexity (Clemente Conte & Gassiot Ballbè 2005), radiocarbon dating (Clemente Conte & Gassiot Ballbè 2005; Gassiot Ballbè & Palomar Puebla 2006), shell mounds (Clemente Conte *et al.* 2009, 2013), spatial analysis (Martínez Cervantes 2004; Clemente Conte *et al.* 2012) and heritage-related topics (Palomar Puebla & Gassiot Ballbè 1999), as well as public outreach (Gassiot Ballbè *et al.* 2003; Gassiot Ballbè & Estévez Escalera 2004).

Among its many contributions, the project identified and recorded 80 shell middens, 50 of them previously unpublished; two lithic workshops with no associated mounds; one surface ceramic site; and

the mounded site of Cascal de Flor de Pino (Gassiot Ballbè & Estévez Escalera 2004). Excavations in 26 different locations and almost 30 new radiocarbon dates led to the proposal of a history of 3300 years of occupation divided in four periods (Gassiot Ballbè & Palomar Puebla 2006; Clemente Conte *et al.* 2013) **(figure 10)**, with some differences when compared to the previous chronological synthesis outlined by Magnus (1974; 1976; 1978). The ceramic portion of the chronology was based on morphological and decorative modes (Gassiot Ballbè & Palomar Puebla 2006).

Period I (cal 1500 - 900/800 BCE)

The oldest known phase for the area was encountered during the excavation of two marshy lowland shell middens, Long Mangrove and Coconut Beach, which are located at the shore of Pearl Lagoon (Gassiot Ballbè & Palomar Puebla 2006; Clemente Conte *et al.* 2013). The shell middens did not feature differentiated layers and were comprised of a single species, *Polymesoda solida*, which suggests the exclusive consumption of these estuarine clams. Vertebrate fauna, ceramics, and lithics were completely absent. This lack of earthenware can be interpreted either as a functional bias or as a threshold for human presence in the area. Both sites were interpreted as processing stations near collection loci, and the meat obtained would have then been transported inland. One radiocarbon date was retrieved from each of these sites.

Period II (cal 800/700 BCE - 400/500 CE)

The second phase was defined through the excavation of three sites related to Pearl Lagoon: Siteiata, Brown Bank, and the seven shell middens that compose the Karoline site (Gassiot Ballbè & Palomar Puebla 2006; Clemente Conte *et al.* 2013). The inland mounded site of Cascal de Flor de Pino (CFP) also aided in the characterization of the period (Gassiot Ballbè & Estévez Escalera 2004; Clemente Conte *et al.* 2013). This phase was defined through ten different radiocarbon dates retrieved at Karoline and CFP, and, according to the researchers, it shows relationships between coastal and inland sites, mainly by means of a shared ceramic tradition.

In Karoline, the shell middens featured well-differentiated stratigraphic packages, formed by *Donax sp.* clam species deposits, as well as a high amount of vertebrate fauna, such as icthyofauna, birds, quelonids, and small mammals (Gassiot Ballbè & Palomar Puebla 2006). In contrast, the Siteiata and Brown Bank shell middens consisted of unstratified *Polymesoda solida* (Clemente Conte *et al.* 2013). The three sites shared two characteristics. First, the middens were clustered in groups of mounds up to 2 m high, which were linked to domestic sites of small independent communities. Second, lithics included *metates* and abundant ceramic fragments were found. In contrast, CFP is an inland site, which was constructed between cal 800/550 BCE and abandoned in cal 400/440 CE. Located on the top of the Cascal hill, its architectural features are spread throughout at least 6 ha (Gassiot Ballbè & Estévez Escalera 2004). The site is comprised of three aligned platforms in south-north direction, more than 3 m high, which were built on a previously leveled terrain. East of these platforms, which featured staired accesses, a 2 ha plaza was surrounded by 18 mounds or platforms of lower sizes. Mounds were built from a combination of basalt blocks and sediment, and one of the lower mounds surrounding the plaza is associated with a spiral petroglyph. The sites of Las Limas and Bella Vista are located within a 5 km radius of CFP (Clemente Conte & Gassiot Ballbè 2004). The first yielded a man-made cluster of 75 columnar basalt monoliths between 1 and 3 m long. Bella Vista features mounds, an anthropomorphic petroglyph, and several monoliths similar to those found at Las Limas. One of these monuments was found in a vertical position, extending 80 cm above ground surface.

It is unclear if the characteristics of the ceramics described in the main publication regarding chronology (Gassiot Ballbè & Palomar Puebla 2006) include the materials from CFP. However, the authors distinguish two different moments. The first occurs between cal 400 and 200 BCE and is marked by the presence of bitroncoconic vessels with marked careens and bowls (Gassiot Ballbè & Palomar Puebla 2006). A small percentage of the ceramics were decorated, featuring fingernail impressions and incised parallel lines. Additionally, Magnus' Pearl Lagoon Polychrome, with its diagnostic red paint on white slip, was found in this context. The second moment, which spanned from cal 200 BCE until cal 200 CE, evinced continuity and discontinuity when compared to the previous moment. On the one hand, it exhibited continuity of vessel shapes and a general scarcity of decoration, specifically the absence of textile-like incised decoration that is common in more recent sites, as well as the

presence of polychromes. Discontinuities, on the other hand, included a tendency towards smoothing the careens in vessels shaped as double truncated cones, the appearance of deep plates and griddles in the shape of truncated cones, a higher presence of incisions in more complex forms, appliqués of small conical mammal-like and figurative elements, and impressions on careens. Pastes are very compact and gray, similar to Usulután pastes from northeast Nicaragua, but the quartz temper is coarser in the Caribbean (Gassiot Ballbè & Palomar Puebla 2006).

For CFP, more data regarding ceramic technology is available thanks to Vásquez Moreno's (2016) thesis. According to the author, pastes usually included quartz, iron oxide, and pumice. The main fashioning technique was modelling (65%), followed by coiling (35%). The majority of the surface treatments consisted of smoothing and a combination of smoothing and later slipping of surfaces. Most samples were undecorated (88%), but principal decoration techniques included impressions (with nail and wood), incisions, and red and black paint, as well as appliqué. In general, firing was undertaken in open hearths (88%), and only 12% of the sherds were fired in closed kilns. Vessel shapes included *ollas* (50%), bowls (27%), griddles (11%), and the less common liquid containers.

Period III (cal 500 - 800 CE)

This period is characterized by the absence of coastal sites. Instead, sites were built inland, and they consisted of earthen mounds built as house foundations. At CFP, for example, new structures were built atop older foundations. An unspecified change in pottery styles (Clemente Conte *et al.* 2013) coincides with the levels of burning and abandonment at CFP. No further data is provided for this period.

Period IV (cal 800 - 1500 CE)

During this period, shell middens, located mainly around Bluefields Bay, were comprised of a unique taxon—*Polymesoda solida*—deposited in a single stratum. The particularity of these shell mounds is in their low and extensive shapes, which makes them hard to recognize in the landscape. Except for Rocky Point at Pearl Lagoon, which yielded high densities of both terrestrial and aquatic fauna, the rest of the middens did not feature any vertebrate fauna. The period was defined based on three absolute dates, including one reported by Magnus at Cukra Point.

The ceramics feature characteristics different from the previous periods, specifically regarding surface treatment and decoration. Incised decoration, which corresponds to Magnus' Cukra Point Complex, becomes highly frequent and is mainly comprised of straight lines, sometimes combined with points. Textile-like incisions are characteristic of this period, as well as the application of incised cords. Polychromy disappears, and slipped surfaces are scarce and monochrome. Additionally, there is an increase in the diversity of shapes, marked by the appearance of *tecomates* and the development of necked vessels. Small, conical mammal-like elements are present, as well as supports.

The attempt to construct a chronology through a multidisciplinary approach to material culture might have resulted in negligence towards the ceramics. Except for Vásquez Moreno's Masters thesis (2016), no ceramic data was published. Archaeometric techniques were completely absent, and in spite of the incorporation of Magnus' radiocarbon dates, a discussion that compared and contrasted Magnus's (1974) chronology with the new results is lacking. As a consequence, the result is an unconvincing proposal that applies similar criteria to those used by Magnus (morphological and decorative modes), but employed with less detail and without truly merging the new data with the old. Unfortunately, the data available for the RACCN is very scarce (exceptions are González Hodgson & Taylor Rigby 2012; González Hodgson *et al.* 2009). Ceramic descriptions, mainly focused on surface treatment and decoration, show similarities with the assemblages retrieved at CFP and Karoline.

During the last decade, archaeological research in the RACCS has been led by the Bluefields Indian and Caribbean University (BICU-CIDCA) and the Centro Arqueológico de Documentación e Investigación (CADI, UNAN-Managua). Surface survey succeeded in recording an additional 63 archaeological and historical sites (Byers *et al.* 2014), but ceramic chronological issues or analysis were not addressed in the publication of the results, and references to ceramics are only focused on decorative modes.

2.2.3 ARCHAEOLOGY AND CERAMIC CHRONOLOGY OF CENTRAL NICARAGUA

The first ethnohistorical accounts of Chontales (Fernández de Oviedo y Valdés 1853) referred to the population living east of Lake Cocibolca at the time of the arrival of the Spanish as *chondales*, which is derived from a Nahuatl word for foreigner (*chontali*). These "strangers", labeled as such by the Nicaraos and the Chorotegas, settled in the Pacific coast, also spoke differently, or "wrongly" (van Broekhoven 2002). In spite of this, Fernández de Oviedo described their markets, economic development, and traditions as similar to those of the groups living west of the Lake (Fernández de Oviedo y Valdés 1853). In the 19th century, many travelers and explorers visited the Central Interior Highlands, mainly reporting archaeological remains such as tombs and stone sculpture (Friedrichsthal 1841; Fröbel & Froebel 1859; Boyle 1866; Pim & Seeman 1869; Belt 1874; Habel 1880; Flint 1882; Crawford 1895). Sequeira (1942) conducted non-scientific excavation of burials in the late 1930s. In 1967, the Museo Arqueológico Gregorio Aguilar Barea (MAGAB) was founded in Juigalpa by members of the *Clan Intelectual de Chontales* to provide adequate storage for artifacts collected by local schoolteacher Gregorio Aguilar Barea and his students, as well as donations from local landowners. Nowadays, the museum stores more than one hundred columnar stone sculptures and many complete ceramic and lithic artifacts, as well as thousands of fragments of objects, alongside a collection of taxidermy and more recent historical artifacts.

Scientific archaeological research in Central Nicaragua started with the work of Richard Magnus, who in 1975 launched a research program that aimed to establish the cultural history of both the Chontales and Zelaya departments.[17] In order to fulfill his goals, he excavated 11 different sites using arbitrary metric levels and conducted a modal analysis of the ceramic fragments. Unfortunately, he never concluded his work, and the publication of preliminary results is quite limited (Magnus 1976; 1980b; Cooke 1977; Martínez Somarriba 1977). Moreover, his interpretations were based on relative chronology in relationship to Greater Nicoya types, since no absolute dating of his contexts was undertaken. Therefore, we are left with a very fragmentary dataset and some impressionistic accounts of fieldwork and labwork. Nonetheless, these preliminary ideas are relevant to take into account considering Magnus' previous extensive studies in the Caribbean coast of the country, which provided him with a different perspective than the researchers who came to Chontales after him. In fact, the author was aware of his alternative view, and he warned other researchers about a "Mesoamerican bias", which in his opinion affected all of our interpretations regarding pre-conquest Nicaragua, even the Pacific coast (van Broekhoven 2002).

Brief descriptions of six of the archaeological sites excavated by Magnus are provided by Martínez Somarriba (1977): Lovigüisca, Cerna, Gutiérrez, Copelito, Morales, and Barillas. Excavations at Lovigüisca, a colonial site with the remains of a church, yielded few prehistoric ceramic fragments. Decorated sherds were minimal, in spite of the excavation of 12 2x2 m pits. In contrast, Cerna, located at merely 1 km away, featured one stone mound measuring 20x5 m and 0.5 m height and yielded numerous ceramic fragments from five 2x2 m pits.[18] Many of these sherds were identified as Greater Nicoya ceramics, whereas the few local decorated samples showed cross-hatched incisions. Through ceramic associations to Pacific Nicaragua, Magnus proposed a chronology for the site between 1200 and 1300 CE. The Los Gutiérrez site is located 1.5 km west of Acoyapa, and here Magnus reported 30 mounds of about 2.5 m height and 15 m diameter. He excavated three structures by means of four pits of 2x2 m. He retrieved ceramics, including incised decorations (some with an "8" motif), finer incised decoration around the rims, and random cross-hatched incised lines. Apart from ceramics, he also collected abundant lithic materials, including axes and flint fragments. According to Magnus, this site should also be placed between 1200 and 1300 CE. At Copelito, a site 11 km north of Juigalpa, Magnus recorded 30 mounds of 15 m diameter and up to 2 m height and remarked on the presence of many large rocks on the surface.[19] He excavated one mound with two pits of 2x2m and documented various types of incised ceramics, as well as ceramics decorated with the incised "8" motif. Following his modal approach, he grouped this site together with Los Gutiérrez, between 1200 and 1300

17 The Zelaya department was transformed into the Región Autónoma del Atlántico Norte and Región Autonóma del Atlántico Sur in 1987, which are now the RACCN and RACCS.

18 According to van Broekhoven (2002, 91), this main mound measured 16x8 m and is located on top of a hill that overlooks Acoyapa.

19 In Gorin's later description (Gorin 1990), the site contains 40 mounds.

CE.[20] At Morales, located 1 km east of Copelito, Magnus reported 15 stone mounds, of around 1 m in height and 5 m in diameter. He excavated one mound almost in its entirety, placing six pits of 2x2 m. He found very few fragments of ceramics, most of which were undecorated. At Barillas, 8 km west of Juigalpa, Magnus observed 15 stone mounds of around 5 m in diameter and up to 2.5 m in height. Six 2x2 m pits were placed, three of which were at the center of mounds, yielding very few ceramic fragments. The remaining three excavation units were placed next to mounds. In contrast to the former, these latter three pits provided a substantial ceramic assemblage. The undecorated ceramics resembled those at Lovigüisca, and the presence of a colonial sherd generated doubts about the site's chronology, but its occupation was still placed between 1200 and 1300 CE.[21]

Sabana Grande, located 2.5 km northeast of Juigalpa, was reported with 15 mounds. Magnus excavated two 2x2m pits on one mound; one of the excavation units reached a 1.65 m depth (Espinoza Pérez & Rigat 1994), which is remarkable given that the average depth in the area is 50 cm. In these excavations, Magnus found walls, a stone floor and the remains of a hearth. A combined techno-functional and morphological analysis of the 10816 chipped and ground stone remains found in these excavations was conducted by Andrea Gerstle as part of her Masters thesis research (Gerstle 1976). A radiocarbon date of 730 ±85 CE (I-9098) was retrieved from these excavations (Gerstle 1976).

Even though excavation techniques followed a stratigraphic approach and systematic methodology, the selection of contexts was based on criteria that privileged the amount of ceramic fragments retrieved rather than the construction of a comparable dataset. For example, Magnus contrasted materials from on- and off-mound excavations without providing a detailed stratigraphic model for his units. Therefore, the chronological applications and the potential to generalize based on his preliminary results are very limited. His ceramic analysis concentrated exclusively on decorative styles and did not incorporate decoration techniques as an analytical variable.[22]

Magnus' preliminary ceramic analysis allowed him to identify two different complexes: Copelito and Cerna. Copelito complex was characterized by the combined presence of ceramics and lithics found in excavations. He identified four different monochrome incised types: incised cross-hatched lines, irregular incised lines, the textile motif, and the "8" motif. Also, he classified one type with perforations all over the vessel surface. He identified the painted fragments as probable imports from Pacific Nicaragua, particularly from Rivas-Ometepe, based on the presence of types Mombacho Incised Polychrome, Luna and Papagayo Polychrome. Monochrome zoomorphic adornos depicting turtles and birds were also part of the ceramic assemblage, as well as spindle whorls (*malacates*), and cylindrical seals. Lithic industries included *manos*, *metates*, flint flakes, arrow points, and axes. The Cerna complex, on the other hand, was also characterized by ceramic and lithic fragments but differed from the previous one, especially in its incised types. In particular, this complex featured one monochrome type with parallel lines and another with triangles around the neck. Additionally, the perforated fragments were dissimilar to those from Copelito, since the perforations were narrower and more closely placed.[23] Magnus also reported zoomorphic appliqués and decorations, as well as geometric ornamental patterns. Polychromes in this complex were very poorly preserved, featuring zoomorphic and anthropomorphic supports. These, together with fragments of Las Marías Polychrome, led him to postulate a connection to the Pacific coast. Lithic industries were similar to those of the Copelito complex, but the Cerna complex also featured jade beads and obsidian flakes (Magnus 1980b).

Preliminary conclusions drawn by Magnus indicate that all sites, except for Lovigüisca, which is colonial, yielded ceramics from Greater Nicoya, interpreted as the result of trade. For the site with the most frequency of imported materials, Cerna, Martínez Somarriba proposed a function as a trader's post (Martínez Somarriba 1977, 8). The other sites could not be considered as such because the amount of local ceramics was always higher than the imported ones (van Broekhoven 2002). For Magnus, this representation of imported sherds in the Chontales ceramic assemblages

20 The site was later dated by Gorin (Gorin 1990) to the Monotá phase (1200 - 1550 CE).

21 The site was later dated by Gorin (Gorin 1990, 192) to the Cuapa phase (1400 - 1600 CE).

22 See Chapter 3, section 3.3.1 for an extensive discussion of this approach.

23 As we will discuss later in this chapter, Gorin recognized three different types of colanders: Rodeo colador (Mayales I phase, 500 BCE - 200 CE), Jinocuao colador (Cuisalá phase, 400 - 800 CE), and Combo colador (Monotá phase, 1200 - 1550 CE) (Gorin 1990).

evinced strong commercial ties to the Greater Nicoya, but he found no conclusive evidence of an active and frequent interaction. Consequently, he concluded that cultural development in Central Nicaragua was largely independent of the Pacific watershed (Martínez Somarriba 1977). Interestingly, in his excavations, Magnus did not find any correlation between the Caribbean and Chontales from an archaeological point of view (van Broekhoven 2002).[24] This accordingly led to a search for the location that, due to its different ecological characteristics, could serve as a cultural frontier between the Caribbean and the central area. For that reason, Martínez Somarriba conducted his research in the department of Nueva Guinea, in the low Yolaina cordillera (400 m.a.s.l.), 100 km west of the Caribbean watershed, where the plains of the Caribbean Sea meet the Central Interior Highlands (Martínez Somarriba 1977). Following an ecological-cultural approach, Magnus then considered the Central Interior Highlands as the border between the Caribbean and Chontales, as well as between Nahuatl and Ulua speakers (van Broekhoven 2002).

To enrich his interpretations, Magnus not only based his work on ceramics but also compared his results with other types of material culture. Therefore, he also looked at stone sculpture, which has been a topic of debate in central Nicaraguan archaeology. In 1970, Baudez stated, following Gregorio Aguilar Barea's insights, that the Chontales sculpture had ties to Greater Nicoya because it was found in contexts associated to polychrome ceramics dated from 800 to 1550 CE. Thus, according to Baudez (1970), the region should be considered as a zone of Mesoamerican tradition, part of the Greater Nicoya cultural subarea.[25] However, Richardson (1942) had previously proposed that the stone sculpture had no ties to Mesoamerica but was more connected to Costa Rica and Panama. The study conducted by Thieck (1971) also concluded that the Greater Nicoya sculpture from Zapatera belonged to a different style than that of Chontales. Magnus not only agreed that both the proportions and style of the rock art were different, but also asserted that local incised ceramics were dissimilar to those from the Pacific watershed. For that reason, he proposed that future research in Chontales should focus on studying the development of local ceramic styles (van Broekhoven 2002).

In 1983, Frederick Lange, Payson Sheets and Aníbal Martínez Somarriba visited the MAGAB and five different archaeological sites in Chontales: Las Lajitas, Cerro de la Vaca, Río Apompuá, La Vainilla, and Agua Buena (later identified as Aguas Buenas). Brief descriptions of these sites were included in a later publication (Lange *et al.* 1992, 48-50), which included location, size, number of mounds, state of conservation, previous research conducted at the site, time periods represented, and lithic and ceramic summaries. The chronology of the sites was established by ceramic associations with Greater Nicoya types, the only "diagnostic" given that no typology was previously established. As a result, the authors were able to place La Vainilla within the Early and Middle Polychrome periods of Greater Nicoya, while Las Lajitas and Cerro de la Vaca were ascribed to the Late Polychrome period. Río Apompuá and Agua Buena were not dated through ceramic associations; for the former, they did not collect ceramics, while the latter did not yield any diagnostic types. Overlooking Magnus' suggestion concerning the utility of concentrating on local ceramic industries before making further assumptions, the authors did not mention or describe local ceramics. The lithic industries received more attention, and two clear differences with Pacific Nicaragua were acknowledged: first, the lack of obsidian, and second, the abundance of fine porphyry. Additionally, they reported the use of andesite, basalt, chert, and chalcedony, as well as the presence of bifacial technology at Cerro de la Vaca and Aguas Buenas (Lange *et al.* 1992). Finally, the authors proposed Aguas Buenas as a ceremonial center based on its large number of mounds (>200) and the presence of petroglyphs.

The main goals of the project coordinated by Lange and Sheets consisted of "(...) exploring similarities and differences in the Nicaraguan sites from their southern Mesoamerican and northern Intermediate Area perspectives" (Lange *et al.* 1992, XVIII), with a main focus on answering the question of classifying Pacific Nicaragua as part of Mesoamerica, the Intermediate Area, or a transitional area.

24 In the same book, van Broekhoven mentions that Magnus did find a link between the Caribbean Siteia complex and the Zoned Bichrome (300 BCE - 300 CE). This led him to propose that during the Late Formative period, the whole country was one homogenous cultural area (van Broekhoven 2002). In a way, this idea of a homogenous tradition during the Formative contradicts Magnus' ecological approach.

25 These observations were based on a very brief visit Baudez paid to Juigalpa in the late 1960s and not on a thorough analysis of the stone sculptures (A. Geurds, pers. comm. 2019).

Consequently, their principal objective when visiting sites outside of the Greater Nicoya, such as central Nicaragua, was to evaluate the presence or absence of imported materials from that subarea in order to establish the connections that may have existed between them. Their work in Chontales is a good example of the dominant narratives in Nicaraguan archaeology at the time, where Greater Nicoya ceramics were used to date sites in other regions of the country through ceramic associations, with little focus placed on local traditions and architectural practices, settlement patterns, subsistence strategies, and rock art.

The paragraphs above describe the state of affairs of central Nicaraguan archaeology by the time two French doctoral students from the University of Paris I-Pántheon Sorbonne, Franck Gorin and Dominique Rigat, decided to start their Proyecto Arqueológico Chontales in 1984, under the guidance of their advisor, Claude Baudez. The main aims of their project were to establish a chronology of human occupation of the study region; to define the cultural identity of the pre-conquest populations living between Lake Cocibolca and the Cordillera Chontaleña; and to outline the variable position of the border between the Mesoamerican and South American influence zones through time (Gorin & Rigat 1987). In order to fulfill these goals, Gorin focused on ceramics, while Rigat concentrated his efforts on the lithic industries. The objectives of the project, together with the analytical methodologies that will be discussed below, echo several problematic theoretical assumptions. First is the assertion that through the study of pottery and lithic traditions, it is possible to directly discuss ethnicity. Second is the view of Chontales as a peripheral region in relationship to cultural macroareas. Instead of applying a local-to regional-to macroregional approach, meaning a thorough study of local developments followed by regional, macro and inter regional assessments, the authors chose the inverted approach, using biased macroregional and regional perspectives to interpret local developments.

Intensive fieldwork seasons were conducted between 1984 and 1987, in which five different survey zones covering 42 sq km were explored. Survey methodology combined systematic and unsystematic techniques (Gorin 1990). Alluvial valleys, the mountains of the Cordillera Chontaleña, and the lakeshore were included to encompass the different ecological components of the microregion (Gorin & Rigat 1988; Gorin 1990). However, survey zones were mainly designed along the major rivers (Cuisalá for Zone I, Cuapa for Zone II, and Acoyapa for Zone V, for example) and the lakeshore for Zone V, so a bias towards freshwater sources should be taken into account when examining these authors' datasets and interpretations. This bias was later confirmed to be problematic by Hasegawa (1998), who found additional sites both on the top and the slopes of elevations. In total, Gorin and Rigat identified 103 archaeological sites throughout four zones, since Zone V did not yield any archaeological evidence. After the survey was completed, the team excavated four sites. While El Cóbano (I 14-15) and El Tamarindo (II 12) were tested in 1985,[26] La Pachona (I 43) and San Jacinto (II 26) were excavated in 1986 (Gorin & Rigat 1987). Three types of contexts were included in their research: refuse areas (SS3 at I 14-15, SS1 at I 43, SS1 and SS2 at II 26), areas between mounds (SS1 at II 12, El Tamarindo), and mounds themselves (SS1 and SS2 at I 14-15, SS2 at II 12). Therefore, on- and off-mound contexts were compared.

The assemblage analyzed consisted of more than 100000 fragments of ceramics and more than 70000 pieces of lithics. For ceramics, Gorin selected a methodological approach combining typological and modal classifications with petrographic techniques. He characterized 44 ceramic types and 11 modes. He conducted an exhaustive descriptive study, which remains the only reference dataset for Chontales including thin section petrography, an overview of decoration techniques and vessel morphologies. The ceramic analysis was reinforced by nine radiocarbon dates, of which four were considered for his proposal. He also incorporated detailed stratigraphic analysis, both to explain his choices for taking into account or discarding dates and to show the exact distribution of the types and modes.

Since the authors considered that lithic industries go through transformations over longer periods of time, they decided to build the chronology of the region based on ceramics (Gorin & Rigat 1988; Gorin 1990; Rigat 1992). However, Rigat's lithic analysis was integrated in the chronological proposal (Gorin & Rigat 1987; 1988; Gorin 1990; 1992; Rigat 1992; Rigat & Gorin 1993), as well as other types of objects such as ornaments, *malacates*, and cylindrical seals.

26 El Tamarindo, due to its limited sample size, was not considered for his chronological proposal (Gorin 1990).

Greater Nicoya	Date	Central Nicaragua	Date	Type site
Ometepe	1350-1550 C.E.	Cuapa	1400-1600 C.E.	San Jacinto, Barillas
Sapoá	800-1350 C.E.	Monotá	1200-1500 C.E.	La Pachona
		Potrero	800-1200 C.E.	El Tamarindo
Bagaces	300-800 C.E.	Cuisalá	400-800 C.E.	El Cóbano
Tempisque	500 B.C.E.- 300 C.E.	Mayales II	200 B.C.E.-400 C.E.	La Pachona
		Mayales I	500-200 B.C.E.	La Pachona
Orosí	2000-500 B.C.E.			

Figure 11: Chronology of central Nicaragua as of 2018 (redrawn from Geurds 2013, 148).

Their chronological proposal, based on the presence/absence of types and modes, is comprised of six different phases **(figure 11)**, Mayales I (500 BCE - 200 CE), Mayales II (200 - 400 CE), Cuisalá (400 - 800 CE), and Potrero (800 - 1200 CE), as well as the partially overlapping Monotá (1200 - 1550 CE) and Cuapa (1400 - 1600 CE) (Gorin 1990). Since a detailed account of the phases can be found in the author's publications (Gorin & Rigat 1987; 1988; Gorin 1990; 1992; Rigat 1992; Rigat & Gorin 1993; Espinoza Pérez & Rigat 1994), only a very cursory summary will be provided, complemented by **table 1**.

Mayales I (500 BCE - 200 CE)
Decorated fragments were abundant, varied, and well preserved. Mayales I is the earliest phase in the chronology of Chontales, contemporaneous with the Dinarte phase at Ometepe Island (Haberland 1986).
Sites: La Pachona (I 43), probably Los Andes (excavated by Gregorio Aguilar Barea, materials stored at the MAGAB), and a site near Juigalpa (agricultural school).
Absolute dating: No radiocarbon date available. Chronology determined based on ceramic associations through the presence of type Bocana Incised, dated to 500 BCE within Greater Nicoya and appearing before the types that mark the end of this phase, such as Schettel Incised, Usulután Negative y Rosales Esgrafiado.
Settlement data: No conclusive data, only three sites documented for this phase, apparently population was very low, settled in dispersed locations.
Burials: Signaled by piles of rocks on the surface, burials were located underneath a flat long stone covering urns containing interments (Los Andes).
Relationships with other regions: In Gorin's (1990) opinion, Chontales was not part of Greater Nicoya during this phase, but it had connections with both the Pacific and northeast Caribbean watersheds. During Mayales I, Chontales developed independently but was an intermediary between Greater Nicoya and the Caribbean coast.

Mayales II (200 BCE - 400 CE)
The types identified for Mayales I continue in this phase, but new ones, both local and imported, also appear. Gorin noticed an increase in the import of Usulután Negative and of Greater Nicoya ceramics in general when compared with Mayales I. Additionally, the author mentions the presence of imported types of unknown provenance.
Sites: La Pachona (I 43).
Absolute dating: Two radiocarbon samples dated, considered contaminated, so no absolute date available for this phase.
Settlement data: No conclusive data available. La Pachona was less relevant during this phase than during its latest phase of occupation (Monotá). Low population density spread over dispersed sites.
Burials: No data available.
Lithics: Preference for jasper, chalcedony, and basalt, in decreasing order of importance. Lithic assemblage is comprised of flakes, cores, scrapers,

Chronology	Lab code	Absolute date	Site	Types (decreasing importance)	Comments
500 BCE - 200 CE		N/A	LP	Jobo rouge excisé Bocana zoned incised, Tumbé variety Matanga polychrome Chaguitillo polychrome Rodeo colador Bálsamo á bord souligné Usulután négatif Yaboa Polychrome excisé	Types also present in Mayales II, so Gorin applies presence/absence criteria. Another difference is densities: 1061 sherds in level 9, >4000 in level 8.
200 - 400 CE	GIF-7230 GIF-7229	1190 ±135 CE (SS1, L8) 865 ± 145 CE (SS1, L6)	LP	Jícaro polychrome Coyolito rouge gravé Guarumo incisé et ponctué Schettel incised Bonifacio excisé et gravé Azabache brun-sur-beige Níspero rouge-sur-blanc Rosale gravé en zones, varieté Rosales Charco noir-sur-rouge, varieté Charco Capulín blanc-sur-brun	
400 - 800 CE	GIF-6895 GIF-6896 GIF-7226 GIF-6893	935 ± 140 CE (SS1, L5) 685 ± 150 CE (SS2, L7) 770 ± 145 CE (SS2, L11) 470 ± 135 CE (SS2, L2/3)	El Cóbano El Tamarindo	Zamora incisé Tambor noir et rouge Atalaya rouge-sur-blanc Subasa polychrome Arrayán noir excisé Jinocuao colador Orégano polychrome Carrillo polychrome Chavez blanc-sur-rouge, varieté Chavez Tripode Africa	Gorin marks a hiatus in the sequence, because the Mayales II types are not present at El Cóbano. Lower levels are mixed with the next phase.
800 - 1200 CE	GIF-6894 GIF-7227	810 ± 145 CE (SS1, L2) N/A (SS3, L2)	El Cóbano	Potosí appliqué Castillo gravé Papagayo polychrome, varietés Incisée y Culebra Ometepe rouge incisé Sacasa strié	Continuity of the folllowing types: Zamora incisé, Tambor noir et rouge, Jinocuao colador, and Subasa Polychrome
1200 - 1550 CE	GIF-7228	1485 ± 140 CE (SS1, L1)	El Cóbano LP	Vallejo polychrome, varietés Lazo, Mombacho, Vallejo Patastule a bandes rouges Madeira polychrome Combo colador Carlitos polychrome Pataky polychrome Bramadero polychrome Granada polychrome Luna polychrome	Sacasa strié, Ometepe Incised appear on the previous phase but reach their maximum frequency during Monota. Same happens with Papagayo, but for this type new varieties also appear, such as Papagayo, Mandador, Manta, Alfredo, Pica, Cervantes, Fonseca, and Casares. Types are present in all levels, so a subdivision of the phase was not possible.
1400 - 1600 CE		N/A	San Jacinto	Miragua común Coronado rouge Olumarouge et blanc	

Table 1: Ceramic sequence for Central Nicaragua based on Gorin (1990).

arrow points, axes, mortars, *metates* and *manos* (both of mortars and *metates*). The presence of grinding stones suggested maize agriculture to Gorin and Rigat (1988).

Relationships with other regions: Chontales continued to be independent from Greater Nicoya, but exchange between the two regions intensified. Commercial relationships diversified in general, including the formation of contacts with northeast Costa Rica (jade) and possibly El Salvador.

Cuisalá (400 - 800 CE)

Materials are scarce and poorly preserved. There is a hiatus between the Mayales II and Cuisalá phases, meaning that no context showed a combination of materials from these phases. Therefore, the transition between these two periods is unclear. Even though there is continuity in decoration techniques already present during the previous phase, such as incisions and modelling, Cuisalá features much less variability. Painted ceramics become more elaborate during this

phase but appear in lower frequencies. Imported ceramics are rare, and undecorated and red slipped modes show continuity with the previous phases.
Sites: El Tamarindo (II 12) and El Cóbano (I 12-15), Aguas Buenas (possibly).
Absolute dating: Four radiocarbon dates, one interpreted as contaminated.
Settlement data: El Tamarindo is a 1.6 ha site with 10 to 16 mounds, subcircular shape, 6-30 m diameter, height <1 m. No spatial arrangement is observed; however, one larger mound had two apparent plazas next to it. Communities were small, with six to 12 low habitational platforms, and showed low complexity. Population rates from the previous phase were maintained.
Burials: No data available.
Lithics: Preference (in decreasing order) for chalcedony, jasper, and obsidian. Flake, ground stone, and bifacial industries featured scrapers, hammers, arrow points, axes, *metates* (one decorated, resembling the Guanacaste phase in Costa Rica) and *manos*.
Relationships with other regions: Imported materials from Greater Nicoya and the Caribbean were found. Gorin proposes that Chontales continued its autonomous development during this phase, and relationships with Greater Nicoya seem less relevant during Cuisalá than in preceding phases.

Potrero (800 - 1200 CE)
Materials are abundant and varied but poorly preserved. There is overall continuity between the Cuisalá and Potrero phases, but a rupture was identified in the ceramics. For the first time, imported ceramics comprise 30% of the decorated samples. This is the only phase where a stone sculpture was found in archaeological context.
Sites: El Cóbano, II 15 and possibly I 17, II 12, II 14, II 32, as well as Aguas Buenas.
Absolute dating: Two radiocarbon dates, of which one is contaminated.
Settlement data: El Cóbano features a 1.4 ha site with ten confirmed circular mounds (plus a probable one), placed along an alluvial terrace. Diameters range between 12 and 25 m, with a maximum height of 1.5 m. An empty space between the mounds and the Cuisalá river was interpreted by Gorin as a possible plaza. A fragment of sculpture associated with lithics and ceramics was found at the site, which Rigat understood as a workshop. Settlements experience an increase in size in relationship to the previous phases, with six to 40 habitational platforms adapted to the topography and with an irregular spatial arrangement.
Burials: No available data.
Lithics: Preference for chalcedony, jasper, and basalt (order shows decreasing importance). Similar industries as in the previous phase, with a strong flake industry with a tendency towards retouched microdenticular microflakes. In general, lithic production was abundant and varied during this phase.
Relationships with other regions: An increase in the ceramic types imported from Greater Nicoya and decrease in local decorated types, together with the appearance of *malacates,* suggest to Gorin that the commercial ties with the Pacific coast are so strong by this phase that Chontales should be considered a peripheral area within the Greater Nicoya sphere, with independent local industries.

Monotá (1200 - 1550 CE)
Materials are abundant, varied, and well preserved. The majority of the archaeological artifacts stored at the MAGAB belong to this phase. Undecorated and red slipped local modes do not show transformations from the earliest phase. Aside from two local decorated types, all other decorated ceramic fragments are typical for Greater Nicoya. Gorin does not discard the possibility of a local production of Greater Nicoyan style ceramics. A local ceramic type, Ometepe Red Incised, appears during this phase and is exported in low quantities to the island of Ometepe. The *malacates* are hemispherical in shape.
Sites: 12-13 sites, including La Pachona (I 43), Copelito, and possibly El Tamarindo (II 12).
Absolute dating: A single radiocarbon sample.
Settlement data: La Pachona is a 4 ha site, oriented NE-SW with 27 confirmed mounds plus nine possible additional structures. Mounds are located on slopes, and their shapes are elliptical or ovular; their diameters range between 8 and 40 m. No formal arrangement could be recognized, but there is a significantly large empty space at the center of the site, which could have served as a plaza. In general, sites feature less than 40 low circular mounds (1 m in maximum height, diameter between 8 and 20 m), their surfaces measure approximately 3 ha, and they do not show specific spatial organizations. A larger oval platform-mound (45x15 m) was also found at La Pachona. In contrast to the previous phase, there are more sites, and the surfaces they cover are larger on average.
Burials: 13 interments were excavated at La Pachona and classified into two types. The first type

is represented by only one burial, which is secondary and direct. The second type includes the other twelve burials, which are secondary, indirect, and in urns. A ceramic necklace and a fragment of a gold pendant were found among the artifacts associated to the burials. These mortuary practices are considered by Gorin to be similar to those on Ometepe Island and south of Lake Managua (Nicaraos). Funerary urns were either ovoid or globular and were sometimes covered with pots or plates placed upside down as lids. Cranial deformation was identified, following the same style as that described by Wyss (1983) at San Cristóbal, a site at the shore of Lake Xolotlán.

Lithics: Preference for chalcedony, jasper, and basalt (order shows decreasing importance). Lithic production was abundant and varied; it included flake, bifacial, and ground stone industries, featuring artifacts such as scrapers, arrow points, *metates*, *morteros*, *manos*, and an increased number of axes, which suggest agricultural practices (Gorin & Rigat 1988). Again, decorated *metates* resemble those of Costa Rica, specifically their contemporaries in Bahía Culebra (Pacific coast).

Relationships with other regions: To Gorin, the higher frequency of Greater Nicoya types in the decorated ceramics, as well as the presence of *malacates* and ceramic beads, indicated a Mesoamerican influence. The ceramic ear ornaments suggest connections to El Salvador, while the earrings and *tumbaga* show links to Costa Rica and/or Panama.[27] For Gorin, the Monotá phase evinced a total incorporation of Chontales into Greater Nicoya, with a possible presence of Nahuatl-speaking Nicarao groups. According to Gorin, these Nicarao settlers mixed with the local population, which continued their traditional ways of ceramic manufacture (undecorated and red slipped modes) but formed an elite that encouraged the import of luxurious and/or ritual objects from Greater Nicoya. Nahuatl toponyms throughout Chontales are additional evidence to Gorin of this occupation.[28]

Cuapa (1400 - 1600 CE)

Last pre-conquest occupation in Chontales. Features decorated and undecorated materials completely different from all previous phases. Also, sherds from the overlapping Monotá phase are rarely found in Cuapa contexts, so exchange between these groups was minimal. The main characteristic of the ceramics in the Cuapa phase is that they are homogeneous and share a very low-quality paste, used for both decorated and undecorated vessels. The poor quality is the result of low temperature firing, which also diminished the quality of conservation. Therefore, the ceramics thresh when put in water. A single colonial sherd was found in a Cuapa context at Barillas.

Sites: Ten sites, including San jacinto (II 26), La Candelaria (I 35), Aguas Buenas, Barillas, El Carmen and Las Lajitas.

Absolute dating: Not available.

Settlement data: In comparison with the previous phases, sites during the Cuapa phase are larger in size (47-300 mounds, up to 6.5 ha) and show clear spatial arrangements, including plazas and aligned platforms. Stone mounds are circular, between 3 and 28 m diameter, with a maximum height of 2m.

Burials: No data available.

Lithics: Preference for chalcedony, jasper, opal, and obsidian (order shows decreasing importance). Lithic production does not seem very developed, but the tendency towards a flake industry is consistent with previous phases. Denticulated flakes, hammers, arrow points, *manos* and *metates* characterize this phase. Also, Rigat (1992) identified what he considered to be a chronological marker for Cuapa: the Cuapa scraper, a multifunctional tool shaped like an orange segment.

Relationships with other regions: The radical differences found in the ceramics, together with the minimum presence of Greater Nicoya types, led Gorin to propose the arrival of a completely different group, one that re-occupied previously abandoned Monotá sites and started new settlements in a progressive manner. These immigrants were well-organized and numerous; for Rigat & Gorin (1993), they probably took advantage of the consequences of the Spanish conquest, which left the Nicaraos of Chontales in crisis after their relationships with the Pacific watershed were severed. The Cuapa phase practitioners were the Chondales described by Oviedo: the foreigners, in the eyes of the Nicaraos. Even though Gorin proposed that the newcomers might have been Matagalpa speakers, part of the Macro-Chibchan language

27 *Tumbaga* refers to an alloy of gold and copper.

28 Even though van Broekhoven (2002) agrees with Gorin regarding the existence of Nicarao colonies in Chontales prior to the 15th century, she disagrees with his conclusions about toponyms. For van Broekhoven, transformations of toponyms go hand in hand with sociopolitical developments and should be regarded as such instead of direct evidence for the presence of certain groups.

family, later work conducted by Espinoza Pérez *et al.* (1994) found no connections between this group's material assemblages in the North Interior Highlands with the Cuapa materials from Chontales.

Gorin and Rigat's research methodology had four main problems. First, the chronology of the region was based on only three excavated sites, while the other 100 were left aside. Of course, it would have been impossible for any project to fund the excavation of such large number of sites. However, different excavation techniques, such as shovel testing or coring, would have allowed for the collection of stratigraphically controlled materials. Another option, taking into account the frequent low material densities in some sites, would have been 1x1 m test pits, which are also successful when the objective lies in obtaining reliable stratigraphic columns for building chronological assessments.

Second, even though Gorin applied an adequate analytical approach, it was unsuitable for his dataset. This resulted in a sampling strategy that was not representative of the local ceramic manufacturing traditions. Gorin's efforts in applying type-variety and modal analysis on decorative techniques limited him to a biased 15% of the ceramic assemblage, leaving aside what he named Common Ceramic and Red Slipped modes, which constituted 85% of his collection. Even though the author noted fundamental differences between undecorated ceramics from Chontales in comparison with Rivas-Ometepe and asserted that those variations might be related to differential storage practices and foodways between the two regions, he chose to build the Chontales chronology using decorated materials because they showed more variation through time (Gorin 1990). In this sense, he argued that no relevant transformations were observed in these two local modes throughout his sequence, and he explains this by assuming that potting practices were totally performed by women, who were the protagonists in the relationships between the *chontaleños* and foreign groups (Gorin 1990). Marriage alliances, in Gorin's opinion, explain the discontinuities in imported ceramics and the continuity in local traditions. Leaving aside the gender bias and fully concentrating on his sampling choices, perhaps the variations in these local modes were not found because for Gorin, they resided in decorative styles and techniques only. Perhaps, looking at other variables, such as clay procurement and preparation practices, vessel morphometrical characteristics, and manufacturing techniques, would shed light on this issue.[29] Gorin did incorporate vessel morphological characteristics and measurements. However, the ranges he established for his seven different types of shapes is too broad, grouping together, for example, diameters between 10 and 46 cm, 4 and 34 cm, 10 and 50 cm. He also omitted other relevant variables such as wall thickness.

Third, Gorin's interpretative models, an issue directly connected to his sample strategy and theoretical views, equate ceramics with ethnic groups (van Broekhoven 2002; Geurds *et al.* 2008). This question concerning the relationship between material culture and identity is an ongoing debate (Shennan 1989; Jones 1997; Stark 1998; Mayor 2010), and extensive studies have addressed this issue from a ceramic perspective.[30] Although ethnoarchaeologists have pointed out the stability in pottery shaping techniques, which is directly connected to the transmission of technical knowledge within a community (Gosselain 2000; Gosselain & Livingstone Smith 2005; Wendrich 2013; Roux 2016), decoration techniques, and especially decoration styles, are more variable. This variability is not only diachronic but also synchronic, and its mechanisms of change are much less tied to social groups than shaping techniques. Therefore, changes in decorative styles should not be interpreted as evidence of occupation, influence, or conquest by other groups; more nuanced interpretative models in which different communities of practitioners network, interact, share, and transfer technical knowledge is more in tune with what is observed in the ethnoarchaeological record. Conflict, violence, imposition, conquest, and relationships of power are not necessarily absent, but they cannot be seen as the only explanations. Also, human mobility plays a relevant role in technical transfer, and it does not always mean the conquest of new territories. Boundaries in pre-conquest times were not directly comparable to our Western notion of frontiers, and ceramic decorative styles definitely should not be used as markers for either territorial or ethnolinguistic divisions.

The final issue in Gorin's proposal relates to his dating techniques. Even though he tried to combine absolute dating with relative dating, radiocarbon dates were in fact used to confirm ceramic associations rather than

29 Even though Gorin incorporated thin section petrography into his analytical approach, he only sampled Greater Nicoyan types, preventing the study of local raw material procurement and processing strategies.

30 See Chapter 3 for a more extensive discussion.

to create a baseline for them. Consequently, two of the confirmed dates (SS2 at I 14-15 and SS2 at II12) were taken from excavations on mounds to match ceramic typology and radiocarbon results. Therefore, they date the construction and/or use of the structure, and their stratigraphy does not necessarily represent the best model for chronological interpretations. Discrepancies shown by the confirmed dates of SS1 I 14-15, for example, were not taken into account. In that context, level 2 dated older than level 7; however, this was not interpreted as a possible contamination. The only off-mound excavation considered was the El Tamarindo date (SS2). However, ceramics from this site were not included in the aforementioned analysis. The rest of the dated off-mound samples (SS3 at I 14-15 and SSI at I 43) were interpreted as contaminations. As a result, we are left with six different phases, of which only one (Cuisalá) has three reliable absolute dates. In spite of this, the error margin of two of these dates (>±130 years), all retrieved from mound excavations, could actually place them in Potrero. Therefore, the most solid date for Cuisalá is the one associated to the ceramics from El Tamarindo that were not analyzed. Mayales I and II, as well as the Cuapa phase, have no radiocarbon dates to prove their chronological ascription, while Potrero and Monotá are based on a single date each. Therefore, the proposed sequence is mostly based on the Greater Nicoya sequence, so Gorin's microregional approach is obscured by ceramic associations as the main chronology building tool.

In spite of the issues explained above, when re-reading Gorin's research today, it is possible to interpret relevant technological aspects of the ceramics he excavated. Regarding clay procurement practices, the author undertook thin section petrography. He concluded that all the samples analyzed were comprised of montmorillonite, a type of clay that is abundantly found in vertisols, which are present in the study area. Moreover, inclusions consisted of basic to intermediate volcanic rocks (andesites and basalts), which are also common within the research area. As far as clay preparation, Gorin considered that all inclusions were naturally occurring in the clay outcrops, so they varied according to the extraction locus and not due to tempering practices. Even though his mineralogical study only included his "diagnostic" minority groups, which do not fully represent local technical traditions, it remains the only study of this kind of archaeological ceramics within Chontales.

In 1998, Etsu Hasegawa carried out two weeks of fieldwork in an attempt to start the Proyecto Arqueológico Chontales II. The project had three main goals. First, he aimed to complete the archaeological site map that was initiated by Gorin and Rigat. Second, he intended to conduct excavations at mounded sites to elucidate their dating, function, and cultural relationships. His last objective consisted of analyzing settlement patterns in order to interpret the social structure of pre-conquest societies in Chontales based on their level of complexity, the presence or absence of social classes, and labor specialization (Hasegawa 1998). However, due to "misunderstandings" with the local population, Hasegawa was limited to fulfilling only his first goal. He confirmed four sites previously reported by Gorin (1990) and recorded eight previously unknown sites: Las Lajitas II,[31] Rincón de las Ánimas I, Rincón de las Ánimas II, El Jicaral, Cerro Cuape, sites 1603-1 and 1603-2 situated on Cerro de la Cruz, and San Antonio. Brief descriptions of these sites can be found in an unpublished report (Hasegawa 1998).

Even though Hasegawa's incursion in Central Nicaragua was extremely brief, he was able to detect that Gorin's survey methodology was biased towards permanent freshwater sources, neglecting the tops and slopes of the numerous elevations found throughout the area. In contrast, during his short unsystematic survey, he succeeded in characterizing general differences between the sites located by the riverbanks identified by Gorin (1990), which were permanent habitational settlements, and the sites on the tops and slopes of elevated geomorphological features. This second group was characterized by the presence of a lower number of mounds, which are bigger in size and constructed only with rocks, without the addition of sediment in their filling. Also, the rocks employed for construction are generally of a larger size than those used in the riverbank sites. Surface materials, such as ceramics and lithics, were absent. Since access to freshwater is complicated and there were no surface materials to indicate daily practices, Hasegawa concluded that these sites, which he placed in the Cuapa phase, were not habitational. In contrast, he interpreted them as

31 This site is locally known as El Salto, so Geurds recorded it using the local name (Geurds 2009, 14).

sanctuaries on the top of hills, whose relationship to their contemporaneous riverbank sites should be studied.

In spite of the fact that Hasegawa exclusively used ceramic associations to date his sites—in the cases that featured surface ceramics—his suggestions for future research in Chontales are lucid. To begin with, he recommended a systematic survey beyond the riverbanks to complete our gaps concerning the Amerrisque mountains and the Caribbean watershed. Second, he pointed out the necessity of conducting horizontal excavations of mounds in order to clarify their architectonic style, characteristics, and functions. In particular, he argued in favor of studying the ceramics, lithics, zooarchaeological, and archaeobotanical remains associated to them. Moreover, he proposed to date the sites located on elevations through absolute methods and warned about the need for an intensive and long term project to counteract growing conservation issues (Hasegawa 1998).

In the beginning of the 21st century, Geurds (Leiden University)[32] started an extensive, long-term research program in the area around Juigalpa. In his first fieldwork season, which took place in 2007, he carried out a partial coverage, non-systematic survey in a 105 km^2 area of the Mayales river subbasin, from the city of Juigalpa until Lake Cocibolca. Survey sections around the mouth of the river were avoided due to presumed recent meandering and massive alluvial deposits (A. Geurds, pers. comm. 2019). The main aim of this study was to broaden the dataset on archaeological sites in the area, but also included recording and protecting culture heritage in Chontales, especially in the area around Juigalpa (Geurds *et al.* 2008). In total, 37 archaeological sites were recorded, most of them previously unknown. Brief descriptions of the sites can be found in an unpublished report (Geurds *et al.* 2008). The contribution of this study goes beyond the new available data on pre-conquest settlement choices in the research area. In his brief report, Geurds is the first author to acknowledge the monumentality of certain architectural features in Chontales (Geurds *et al.* 2008, 34). Moreover, even though he recognizes that the work carried out by Gorin (1990) and Rigat (1992) represents the basic available data on ceramics and lithics, he claims that their systematization of the ceramic data in favor of chronological agendas has blinded research from studying the characteristics of ancient communities, their social complexity, and domestic practices. Consequently, he suggests that future excavations should go beyond stratigraphic test pits aimed to establish a chronology and move towards horizontal excavations aimed at clarifying domestic contexts (Geurds *et al.* 2008). Therefore, he proposes a bottom-up approach to study the various settlements and households, the structure and evolution of public spaces, the agricultural systems, the settlement patterns in connection to the local geography, the regional contact infrastructure, and finally the position of Chontales within an interregional context, characterizing its relationships with both the Pacific and Caribbean watersheds. Additionally, he warned about the progressive destruction of archaeological heritage in the area and stressed the need of a protection program.

The second season, carried out in 2009, focused on stone sculpture. The main goals consisted of documenting and characterizing this type of art, as well as an opportunistic survey to record sites with sculptures. Additionally, the project aimed to elucidate macroregional interactions with the Caribbean coast. As a result, the survey area consisted of a triangular zone from the northwest of Juigalpa to the border between Chontales and the RACCS, which included sections between Juigalpa, Cuapa, and Acoyapa. The towns of La Libertad and Santo Domingo (both in Chontales), as well as El Ayote (RACCS), were also incorporated. In total, Geurds recorded nine mounded sites (El Salto, San Jacinto, Babilonia, Aguas Buenas, Las Lajitas, El Despoblado, and Los Andes in Chontales; apart from El Gavilán and Palmira Dos in RACCS), two rock art sites (La Mica petroglyphs in Chontales and La Lagartera in RACCS), as well as a columnar basalt quarry (El Pedregal, in Chontales).[33] Detailed mapping of San Jacinto, the site used by Gorin to define the Cuapa complex, yielded two more mounds than previously recorded, producing a total of 199 structures. Regarding the spatial arrangement of the site, Geurds observed the presence of an extensive plaza (80x60 m), interpreted as a public place. Mapping of Aguas Buenas (Gorin 1990; Lange *et al.* 1992) yielded 513 mounds in total, including both public and residential mounds. This number of mounds surpasses

32 The first season was carried out in collaboration with Laura van Broekhoven and Jorge Zambrana.

33 In this report, Geurds referred to the site El Gavilán as Nawawasito (Geurds 2009, 26); however, later on he renamed it El Gavilán for clarity, as Nawawasito is also the name of the *comarca* in which the site is located.

any other archaeological site known in Nicaragua, but the contemporaneity of the residential mounds with the rest of the complex should be tested (Geurds 2009).[34] El Salto, interpreted by Geurds as a ceremonial center, consists of 19 mounds, including nine circular in the typical Chontales style and ten rectangular platforms. All mounds were built following a line along the northeastern slope of the elevation where the site is located. Various fragments of monoliths were recorded in different sectors of the site. The corresponding residential area of the site is known as Las Lajitas, a site built on a terrace next to the Mayales river, comprised of 58 mounds arranged in a semicircle with circles of rocks located in the periphery. The site of El Gavilán is defined by 42 structures, which combine two quadrangular platforms with 39 circular mounds (some of them very large, up to 30 m of diameter and 4 m height) and one ovular structure. Geurds and his team found 43 fragments of sculptures in the Chontales style directly associated to the quadrangular platforms. For the authors, these structures should be considered non residential architecture; the site could also have served as a peregrination center (Geurds 2009; 2020). Results from this fieldwork season suggest that the characterization of the Chontales style for stone sculpture requires a redefinition, taking into account that its distribution extends beyond the department of Chontales and is also found in the RACCS (Geurds 2009). Also, the author began asking questions about social complexity, attempting to connect public architecture, residential mounds, spatial arrangements, and stone sculpture with site hierarchies. Geurds proposes two different hierarchical levels, with Aguas Buenas, San Jacinto, and El Gavilán at the top. Smaller sites, with low quantities of residential mounds and high densities of public architecture, would comprise the second level of the hierarchy. However, Geurds proposes to move beyond traditional site typologies because in his view, ancient Central Nicaraguan groups followed alternative material expressions, which stressed stone sculpture in contrast to monumental architecture (Geurds 2009).

One of the greatest issues in Chontales-style sculpture is the lack of contextualized finds. With a corpus of approximately 200 statues nowadays located all over the world (Geurds 2011a), architectural and chronological contexts are not available for their study. Therefore, their meaning and function is still unknown. Consequently, the site of El Gavilán was selected for the 2010 and 2011 fieldwork seasons based on its *in situ* statuary. El Gavilán is a mounded site located on a low sloping hilltop immediately north of the intersection between the Siquia river and its tributary, the Nawawas river (Geurds in press). The site is thus part of the Escondido river basin, which is born in the Central Cordillera and flows into the Caribbean sea. Administratively, it is situated within the RACCS and within El Ayote municipal district.

The main goals of this season included topographic mapping of the site, as well as the excavation of 26 stratigraphic shovel tests and one test pit to differentiate habitational and public spaces. Also, the project aimed to establish both absolute and relative chronologies for the site (Geurds 2011a).[35] Apart from that, 3D scanning of all the monoliths found in context was carried out, together with a geophysical survey aimed at identifying raw material outcrops (extrusive volcanic rocks). Finally, a macroscopic analysis of the statues stored at the MAGAB was conducted to create a comparative dataset between El Gavilán and the Chontales statues (Geurds 2011a). Three radiocarbon dates were retrieved from the site (**table 2**).

The site featured 42 mounds, divided in two main categories. The first one consists of 36 low circular earthen mounds, measuring 11 m in diameter and less than 50 cm height. The remaining six structures measure 25 m diameter and up to 2 m height. Construction practices included the use of boulders of up to 50 cm in diameter. Structures 1 and 2, which belong to this second group of mounds, are perfect squares and have steps on their four sides,

34 Mound recording and excavations within the southern sector (what Geurds refers to as the residential mounded area) and the core of Aguas Buenas point to different chronological phases. The southern part, the Lázaro Villegas site (Arteaga 2017), seems to be later than the first construction event of the geometric patterned mound configuration located to the north. However, since this public area was subsequently modified (Auziņa 2018), relationships with this southern site, as well as with Alberto Obando (located 500 m to the west of Aguas Buenas) and the mounded sites within the lots of Sebastián Ríos and Juan Suárez, should be studied. See Chapters 5 and 8 for a thorough discussion of Aguas Buenas, and **Appendix 7** for the site description.

35 Excavations were undertaken on-mound to confirm or discard their function as habitational places (Geurds 2011a, 7).

Sample	Material	Age in BP	Calibrated age
Beta-294642	charcoal	2050 ±30	65 ±85 BCE
Beta-294641	charcoal	1360 ±30	705 ±55 CE
Beat-294640	charcoal	1350 ±30	710 ±70 CE

Table 2: Radiocarbon dates from El Gavilán site (modified from Geurds 2011a, 9).

two very uncommon architectural characteristics for Nicaragua (Geurds in press). Results from these excavations attest that the mounds were built in one single event.

A total of 58 carved and uncarved sculpture specimens were recorded at the site, which feature four different rock types as raw materials. In particular, columnar basalts, ignimbrites, andesites and carbonate rocks were used. The quarries for these raw materials, except for the latter, are found 1.5 to 2 km away from El Gavilán, although these materials were available immediately next to the site. Uncarved megaliths were probably employed as columns. Statues measure up to 5 m in height, with a restricted circumference (<50 cm). Representations are usually anthropomorphic, achieved with techniques such as low relief and incision carving (Geurds 2011a). The sculptures were found in association to Structures 1 and 2, some of them even at the center of the former.

The excavations yielded ceramic and lithic fragments in very low quantities (Geurds 2011a). Ceramics were made with local clays, rich in iron oxide; their state of preservation was poor, and fragments measured less than 5 cm. Decorations such as striations and linear thumb impressions along the rims were observed (Geurds 2011a). Moreover, pieces of burnt clay were found, some of them with log imprints (Geurds 2011b), suggesting the presence of wattle-and-daub walls (Geurds 2011a). The low quantities of ceramic materials should not be interpreted as evidence for temporary campsites because at least a semi-permanent settlement is necessary for maintaining such walls.

In a recent publication, Geurds (2020) proposed to see El Gavilán as a public commemorative regional center, where groups from both up and down river would gather. In particular, the combination of monumental architecture and stone sculpture expresses leadership and communal identity through "(...) the public display of adorned human figures in life-sized stones" instead of emphasizing the exchange of exotics, such as in other regions (Geurds in press). These practices of remembrance created forms of shared identities that were communicated throughout the region.

Following this interest in monumentality and alternative ways of interpreting it, from 2012 until 2014, Geurds shifted his view towards Aguas Buenas and started a research program that involved four different phases of study. First, the site was mapped in detail, using the combination of a differential GPS and a total station, in order to create a digital elevation model of the site's unique design (Geurds & Terpstra 2017; Auziņa 2018). Second, selected man-made mounds were excavated to establish both relative and absolute chronologies, as well as the mounds' functionality in relationship to their morphology and location within the site (Geurds 2012; 2013a; 2014). Additionally, intensive surface survey of the site to define its boundaries (Geurds 2014) and non-systematic collection of diagnostic materials was undertaken (Geurds 2012; 2013a), and petroglyphs within the site were documented (Vlaskamp 2012; Vlaskamp *et al.* 2014; Arteaga 2017). Finally, surface survey focused on preliminary mapping of Aguas Buenas "satellite" sites was conducted in Piedras Grandes I,[36] Copelito I and II, Santa Rita, and Barillas (Geurds 2014). Excavation of four mounds (M1 in 2012, M300 in 2013, M34 and M36 in 2014) was conducted using the quadrant method to expose the profiles of the structures for stratigraphic analysis, preceded by the trench excavation of one mound (M135 in 2011).

The urgent necessity to understand the role of Aguas Buenas, mound construction and use practices, as well as the need to re-define the ceramic chronology of the area, drove Geurds to start a larger scale project in 2014, which continues through the present and is the baseline for this research.

36 Piedras Grandes II was also included in the survey, but high dense vegetation prevented its exploration.

3 Just a matter of time?

The first definition of the discipline of archaeology that I was exposed to was the "(...) study of past societies primarily through their material remains—the buildings, tools, and other artifacts that constitute what is known as the *material culture* left over from former societies" (Renfrew & Bahn 1992, 9). Even though this is a very basic conceptualization of our discipline, and several alternative and more theoretically updated definitions have been proposed in the past few decades (for example, Joyce 2016, 8), the characterization of archaeology almost always includes the notions of past and material remains. But what is the past? Is it really detached from the present and the future? And what are these material remains, what is materiality, how does it come into being? Is it discretely bounded or continuously unfolding? How do the trajectories of materiality and human communities intersect? Are these itineraries actually separate? How can materiality serve as a tool for studying temporalities? What is time, and how can research into ceramics be employed to answer any of these questions?

According to the Oxford English Dictionary (2010), time is "the indefinite continued progress of existence and events in the past, present, and future regarded as a whole." This definition implies a flow, an unstopped movement, and poses a problem that is fundamental to archaeology: the denial of duration. One of the earliest Western definitions of time can aid us in explaining this issue. For Aristotle, "(...) time is the number of motion in respect of before and after" (Annas 1975, 97). Since the present cannot be considered part of time, the movement between before and after defines time. In a way, then, time is the past, because we can only define it in relationship to its past trajectories. In order to make sense of this, we think of specific events or moments as points in an imaginary timeline. However, we do not stop to debate about the duration of the interval between points, and hence about the different itineraries between points. Apart from this linear conception of time, we—archaeologists—also have a cyclical notion of time, in which events "repeat" in set intervals.

Consequently, I will start this chapter by briefly discussing the different conceptualizations of time in archaeology, primarily in regards to the construction of chronologies and stressing Braudel's three timescales (Bintliff 1991; Knapp 1992; Holtorf 1996; Lucas 2005; 2008; Bailey 2007). At this point, I will provide a short summary of the ways in which archaeologists have organized materiality—mainly focusing on ceramics—in chronological models that, organized into periods, stages, phases, or horizons, explain continuity and change through time. Then, I will explore issues concerning materiality (Appadurai 1986; Kopytoff 1986; Ingold 2007a) and its relationships with time through the notions of palimpsest (Olivier 2011) and memory (Connerton 1989; Nora 1989; Pauketat 2014). Through an alternative view of materiality as a mutual constitution of humans and things (Ingold 2007a), as the non-dichotomous flow of interweaving itineraries of bodies and objects, referred to here as embodiment (Cresswell 2012), I will argue that the ways archaeologists have traditionally constructed their chronologies is conceptually limited. Bodies move and make things according to socially learnt practices; therefore, learning processes are situated in a cultural context (Lave & Wenger 1991), in times and places, in a continuous state of becoming. We learn how to make things; we learn a craft, a technology within a community. Consequently, identities are learned, embodied, and performed through differentiated materialities (Basu & Coleman 2008). The study of different ways of embodying materials, or of the groups that, through shared learning processes, form communities of practices (Wenger-Trayner & Wenger-Trayner 2015), through the lens of an anthropology of techniques approach

(Lemonnier 1986), can aid in the construction of alternative chronological narratives.

Traditional ceramic chronologies fail at encompassing the palimpsestic complexity of materiality, not only because they mainly focus on formal characteristics of vessels, such as shape and decoration, but also because typological or modal discourses rely on a basic bias that assumes that all types or modes go through a history that involves their introduction, popularization, decline, and disappearance (Nelson 1916).[37] The abuse of diffusionism in the past has obscured and flattened local processes by applying culture-historical and specifically culture area paradigms. The typologies used to organize time in archaeology generally do not take into account that bodily practices and ways of making have cultural signatures, or technical styles (Roux 2016), that have their own history, which also includes histories of aesthetic appreciation expressed through beauty and craftsmanship.

The study of ceramic production through the disentanglement of the manufacturing steps practiced by communities of potters, or the operational sequence, is just one of the many itineraries to take into account in the construction of a chronological overview of an area. However, even when constructing a chronological narrative that is mainly based on ceramic manufacture, it is also essential to take the differentiated itineraries of other practices into account, such as lithic production, mound construction techniques, and foodways. Some insights into social organization will be considered, as well as both brisk and more long-term, slow moving processes, such as volcanic eruptions or deforestation. This history of the different itineraries of intersecting practices will be conceived through an approach that views chronological narratives as vibrant and vital (*sensu* Bennett 2010), that, instead of focusing on simplified, inert, passive, and inactive aspects of pottery, aims to describe a world in which materials and practices are lively and interwoven. For this, I will attempt to construct a chronological narrative that goes beyond chronographies and periodizations and instead integrates the different trajectories of ceramic manufacturing practices with the palimpsest of present materialities.

37 These biases related to ceramic typologies, established by Nelson more than a century ago, continue to be assumed in chronology building.

3.1 TIME, ARCHAEOLOGY, AND OBLIVION

During the hype of processual archaeology, F. Plog strongly questioned the conceptions of time in archaeology, which he characterized as myopic and linear (Plog 1973). According to this view, time is simply a line connecting points, for which the starting point is the past, the end point is the present and the direction of the arrow indicates the future, which is precisely where the line moves towards. Time is then movement; it is linear, and the "moments" are tacks that mark an instant, a point. We cannot apprehend the present because it is always going away. As Borges (1968) beautifully said to us many decades ago, the present is ungraspable, which is why a philosophical school in India directly denies it.[38] Regarding this linearity, Plog provides a rather illuminating example that strongly corroborates recent criticisms of ethnoarchaeology (Gosselain 2016). Plog says: imagine that we do ethnographic fieldwork in community X. After 10 or 20 years without returning, we do another study in the same community. At the beginning of our investigation, we observe a clear increase in the dependence on agriculture. Most likely, we will infer that this increase had a linear trajectory. And here comes the genius of Plog, which closely resembles many of Tim Ingold's reflections, made 45 years later: "Unfortunately, while two points provide a minimal definition for a straight line, they do not necessarily define a straight line. Lines of many different shapes could connect the two points; dependence on agriculture could have varied significantly rather than increasing regularly" (Plog 1973, 187).

Although Plog seems to omit—apparently intentionally—the suspicious similarity between this type of inference and those of gradual evolutionary thinking, as well as the fact that the idea of the two points in itself, the author illustrates the simple objection that the sequences of events that can produce the same patterns are various. For Plog, even though human behavior does not follow a unilinear pattern, that does not mean that it is random, and archaeologists have a unique privilege as a discipline; they can study the processes of change, and thanks to this, it is possible to argue why certain sequences of events, or individual events, and their associated practices, were more likely to have occurred than others.

38 I will return to the present in a few "moments".

This reflection is very encouraging for research focused on chronology because the trajectories of different kinds of events, actions, and practices can be highly capricious, although simultaneously constricted and enabled by certain universes of possibilities. Humans are born in a particular context in which they learn how to belong to their group (Lave & Wenger 1991), and they are taught the different legitimated ways of embodying it, so this context is empowering yet at the same time constricts the possibilities to break with those learned ways of doing everything humans do. Even the materialities that are part of this incorporated universe are made possible and continually re-produced through this repetition of practices. However, the relationships between structure, actions, and practices are dialectical rather than unilinear (Joyce 2004; Sassaman 2010). Let's illustrate this with a simple and contemporary example.

In 1990, the government of Carlos Menem, following the *menemista* decalogue as defined by Roberto Dromi, privatized all state companies belonging to the Argentinian government and people. Public opinion was divided; on the one hand, there were strong arguments in favor of privatization, mainly based on the fact that public companies were in debt. On the other hand, many citizens were concerned about the upcoming massive loss of jobs and the liberalization of public assets. The works of TELECOM, a telecommunications company with French, Italian, North American, and Argentine capitals, included, among other things, the renewal of telephone wiring. Suddenly, the streets of my hometown Rosario were flooded with thin steel cables covered by brightly colored rubber. The practice of collecting the cables to make bracelets immediately became fashionable among kids at schools, neighborhoods, and sports clubs. Children wore those bracelets with the pride of craftsmen. The most original patterns received praises at the school courtyards; teachers, friends, parents, and grandparents received special ones as tokens of affection. Even though wearing a steel cable on the wrist or ankle is not precisely comfortable, that did not discourage the practice. Certain innovations were generated, such as the variant of necklaces and earrings. However, bracelets were the most common "type" of object. The colored wires that were harder to get were exchanged at recess. A whole system of value was created, where a certain amount of one color was worth some quantity of another.

How can we explain these practices? The idea that the generation that grew up during the privatizations of the 1990s created bodily ornaments with the waste left on the streets by the new private company—which eventually charged the most expensive telephone service in all of Latin America and then went bankrupt during the crisis of 2001—is poetically attractive. However, what can we actually infer about the trajectories that resulted in these bracelets? And where are these bracelets now? A fast inquiry regarding the bracelets' whereabouts was unsuccessful, and at first glance, nobody seems to have written anything about "bracelets with cables from Telecom Argentina". Apparently, time has erased them. Maybe we—the generation of Argentinians who grew up in the 90's—have forgotten about the bracelets, but, when prompted, we immediately remember them. We forgot them because they are not part of our present; they are not a part of our current universe of daily experiences. When we walk in the streets today, we no longer see hundreds of TELECOM workers with their trucks, flooding our streets with colorful wire. We do not hear journalists discuss the pros and cons of privatization, and "De música ligera" is not playing in our heads 24/7 anymore. It is not our present; it is our past. Maybe it is not possible to speak of the present without thinking of the past and the future.

Deeper discussions regarding the notions of time in archeology are quite recent (Lucas 2005, 2008; Bailey 2007) and deal with both our conceptions as archaeologists (Gosden 1994; Holtorf 1996) and how they structure our narratives about historical evolution,[39] as well as the differing views about the past in different human groups (Gosden & Lock 1998). Our vision of chronology, which relies on the science of computing dates, matches these conceptions, since we construct chronologies as directional, linear movements split into various divisions (Lucas 2005). We tend to glue the cyclical dimension of time (for example, the seasons), awkwardly on this timeline. For that reason, we use spatial patterns to infer temporal ones (Plog 1973). In both absolute and relative chronologies, we associate space and time, while we simultaneously neglect duration. In the case of relative chronologies, loci such as layers (stratigraphy), as well as the position of certain modes or types in ceramics (presence/absence, seriation)

39 I am referring here to evolution as a synonym of change, in the absence of a better translation from the Spanish concept of "*devenir histórico*", which translate almost literally as historical becoming.

mark temporality; the same assumptions are inherent in absolute dating techniques, which connect datable materials found in a specific spatial position with a more or less specific date. In this sense, the space-time continuum (Einsten & Lawson 1921), a physical model that fuses spatial and temporal dimensions, is not an alien concept in archaeology; we cannot think of time divorced from space. At the same time, we cannot observe space without looking at time. When we make temporal inferences, we connect the different points (types, bones, modes, pieces of charcoal, etc.) with a line that represents time and processes of change. However, as archaeologists, we are faced with the fact that what we investigate cannot be translated into one single line of time, because different processes actually operate at different temporal scales and rhythms (Smith 1992; Bailey 2007).

In this sense, the work of historian Ferdinard Braudel (Braudel 1949) is of fundamental use to archaeologists. The relevance of his work not only lies in his proposal of three different time scales, but also in his insights into duration as the inner dialectic between different temporalities. These two ideas, in a way, revolutionized how we look at time from an archaeological standpoint. Unfortunately, this has not resulted in an updated chronology building effort from within our discipline, but rather a reinterpretation of old chronological models with new vocabulary (at least for southern Central American archaeology). Chronologies are still mainly based on ceramic formal attributes and expressed in charts. A true revolution, though, would smash the pillars of narrative structure and replace it with a completely new *grammatica*. But we will return to that later; for now, we will focus on Braudel's different time scales, which are hierarchical because they constrain each other (Knapp 1992). In summary, the author proposed three interconnecting scales of time: first, the *longue durée*, which is comprised of long-term, slow-moving processes, which include many geographic and environmental ones but also *mentalités*. Second, the *moyenne durée*, or *conjonctures*, which are the medium-term cycles (several generations or centuries) related to social structures that mold, constrain, and alter the boundaries of human lifeways. The third and last, *l'histoire événementielle*, refers to individual actions, events, and personalities. It is difficult to see how our Cartesian, two-dimensional chronologies with a vertical sense of time that deals little with duration can encompass this more complex, multidimensional overview of time.

This model, which is based on change, was the foundation of the *Annales* historiographic school. This program, through its "total history" objective, brought multidisciplinarity to historical methods and combined microstudies with inquiries into structure and longer-term processes, as well as turned the lens of history on ordinary people and their daily lifeways. As Leone pointed out, "with its emphasis on time, space and change, archaeology is structurally similar to history" (Leone 1978, 30), so it is not surprising that the *Annales* school also had a deep impact in archaeological thought (Bintliff 1991; Knapp 1992; Smith 1992). Archaeological inquiry has also influenced the *Annales* perspective of multi temporality through the study of the palimpsestic nature of materiality, from a practice theory, or embodied, point of view.

3.2 HOW THE PRESENT BECAME THE PAST: THINGS AS PALIMPSESTS

> "(...) 'Nature has no history'. The laws of Nature are timeless truths. For history, time is the great reality; and the future is the infinite well-spring of those events which, when they happen, become present, and whose traces left upon the present enable us to reconstruct them when they are past." (Collingwood 1927, 319).

The definition of archaeology as a discipline, as stated in the paragraphs above, deals with temporalities and materiality. In the previous section, I outlined some discussions regarding our conception of time(s). I will start this new section by briefly analyzing Collingwoods' divide between past and present. For him, when events happen, they are the present, and after they finish, they become the past. In this sense, our view of the archaeological record, of the "material traces left by past societies" as products of the past, makes sense, but if behavior in a specific context of space-time represents the intersection and interweaving of various processes, with differential temporal rhythms that operate in dissimilar time spans and with different frequencies and amplitude in their variability, maybe the point where we can actually observe their interaction and combined

effects is in the intersection with the present (Bailey 2007, 214). In that sense, "the material world is of necessity, a composite of objects of differential duration, which represent at the very least either temporal palimpsests or palimpsests of meaning" (Bailey 2007, 209). Palimpsests are "the traces of multiple, overlapping activities over variable periods of time and the variable erasing of earlier traces" (Lucas 2005, 37), so in this sense, present materiality is multi-temporal. "*Le passé est dans le présent, comme une mémoire au présent, mais l'inverse est vrai également: si le présent contient des eclats du passé, le passé contient également de l'actuel, de l'<<a-present>>*" (Olivier 2011, 319). Consequently, the dichotomy between past and present blurs; the fragments of the past are inscribed in the materiality of the present (Olivier 2011, 319). We live in a material palimpsest; the archaeological record is a palimpsest that also incorporates the archaeologist who unearths material remains. Archaeology, then, studies this entire palimpsestic material record.

The decision to define palimpsests based on Lucas was pragmatic, since I wanted to avoid the discussion of the term itself,[40] which exceeds the objective of this section, and move on to the temporal implications that are the focus of my research. However, I did review alternative definitions such as the one presented by the Oxford dictionary, which characterizes palimpsests as "something reused or altered but still bearing visible traces of its earlier form" (Oxford English Dictionary 2020). According to the Merriam-Webster dictionary, a palimpsest is "something having usually diverse layers or aspects apparent beneath the surface" (Merriam-Webster 2020). All definitions agree on the deposition of layers of different temporalities in the same location. Curiously, these conceptualizations are suspiciously similar to our understandings of stratigraphy. Bailey (2007) builds on Lucas' definition of palimpsest but stresses two main aspects: the erasure of older information in contrast to the preservation of the newest traces and the fact that actually not all of the oldest information is deleted, so there is both an accumulation and transformation of activities resulting in a totality that is different and greater than its constituents (Bailey 2007, 203). Therefore, Lucas' definition seemed like the most appropriate; however, it was limited in the sense that—unlike Bailey's five categories of palimpsests—it did not delve deep into the various temporal palimpsestic qualities of the world we inhabit, which is a world of materials (Ingold 2007a, 14) and therefore an archaeological world. When observed through Braudelian lenses, these palimpsestic attributes can be understood in their three different time scales: the eventual or more individual, the conjectural or "social", and the *longue durée* or "environmental". Let's take a pot sherd as an example, with the dual aim to apply these thoughts to the subject of this book and to compare and contrast our views with other stories archaeologists have told about pot sherds (see Holtorf 2002 for an example).

In the eventual time scale, the ceramic fragment was first conceived by a potter, who followed the production process learned from—most possibly—his or her immediate social context. These manufacturing steps involve particular manners of relating to the landscape, which can be assessed through the study of the procurement of the materials employed during the manufacturing process; the other materials that are sought and found during these prospections that might relate or not to ceramic manufacture; and the intersection between production loci with water and fuel availability, or hunting and gathering practices, for instance. Also, these ways of doing imply motor habits, bodily gestures, and technical styles that are signatures of situated learning and therefore of the potter's overlapping identities.[41] The use of the vessel, on the other hand, can also be seen through the conjectural scale of time, in which, for example, these receptacles could have functioned as mortuary containers of human remains. This tradition, which outlives—and probably buries—the potter, might be shared with other communities of potters, who actually manufacture their vessels in distinctive ways. In turn, the differential technical aspects of ceramic manufacture might change through time in each community of potters due to diverse factors such as transmission, innovation, or technical transfer; however, in this exercise of our imagination, people keep being buried in pots. Then, this same pot sherd that was conceptualized and realized by the

40 The word comes from the Greek term *palimpsēstos*, which integrates *palin* (again) and *psēstos* (rubbed), referring to superimposed previously erased writings (Oxford English Dictionary 2020).

41 It is also possible that the potter might have adopted ways of doing that are different from the one he learned within his first social circle. For example, after marriage, some women re-learn the craft from their mothers-in-law (see Herbich 1987 as an example).

potter's hand, that then contained human remains, is later subject to several taphonomic processes, which involve our deepest time scale, the *longue durée*.

This example of the sherd is actually partial, and in a way delves into the three temporal scales in a reductionist and flat sense, without taking into account their intersections and interweavings. This is the way in which Braudel's vision has been applied to chronology in archaeology, without really challenging our analogy between stratigraphic columns and the real complexity of the histories we are trying to write. In these Cartesian chronological constructions, imaginary points in time (usually layers, artifacts, organic remains) that are dated through absolute methods, ignoring their probabilistic nature (Joyce 2016), comprise compartments—usually quadrangular and vertical—that correspond to phases, horizons, or periods. The lines that break these divisions do not allow overlapping; in the type-variety system of ceramic classification, for instance, pottery with exactly the same characteristics will even be named differently if it appears in another "period". These boundaries also oppose past from present, as well as distinguishing different pasts from each other. It seems that, paradoxically, our manner of conceiving, constructing, and thinking through chronologies represses temporality, which is maybe a legacy from the exclusion of time in social theory, as pointed out by Giddens (1979, 7) and Fabian (2014). Therefore, it is pertinent to ask ourselves how a truly Braudelian chronology should not only narrate the palimpsestic archaeological world, but also graphically express it. In this section, I will try to answer the first part of this challenge, and I will leave the second part for Chapter 8.

So let's go back to our potsherd. We should have actually started its story with the *longue durée*, with processes such as magma flowing, volcanic eruptions, erosion, transport, rain, and soil formation, which are some of the ways in which our potter's clay, potential tempering materials, water, and fuel came into being by the time he or she ventured into the geologic prospection that led to raw material collection.[42] Then, maybe the intended aim of the vessel was mortuary, or maybe our potter did not have one sole objective in mind: it might be possible that the vessel was intended to be used for multiple purposes, and that generations after the manufacturer—if the pot survives, and even if it does not!—will also use it in various ways for which it was not necessarily intended, depending on how it relates to other vessels, landscapes, people, and their doings (Tilley 2007). The pot might also travel as a container of desired goods to and through places far away from its production context. All of these possible scenarios entail participation in constellations of practices and even maybe in networks of practices, which tell us about the conjectural time scale.[43] After its use, discard, and potential re-use(s), our small protagonist might actually be "born" and immediately start suffering from several processes that bring us back to the *longue durée*: volcanic eruptions, erosion, transport, rain, flooding, soil formation processes, bio-turbations, etc. Eventually, I dig it up, clean it, bag it, wash it, label it—adding a new layer to its material palimpsestic ontology—export it, examine it at the lab, take pictures of it, make drawings of it, cut it for thin section petrography—sometimes accidentally destroying it—store it in a box, and possibly let it reside at a storage facility for the "time being". Unless I write about it somewhere and someone reads about it, it will be forgotten until someone needs more space at the storage facility or decides to study it again a few decades after my brief—yet relevant—interaction with it. In this way, the three time scales are omnipresent… they are always and everywhere present.

So far, I have concentrated so much on the overlapping temporalities of our palimpsestic pot sherd that I have reduced the vast richness of our little friend's history to only one aspect. The pot sherd is not only traveling one temporal journey, but actually several trajectories that are bundled together (which do not form a nice, simple line between two points). Such trajectories are physicochemical, like the transformations from magma to rock, from rock to clay, from clay to pot, from pot to sherd; and some imply different meanings, like mother earth, ancestors, gods, heritage, statistical variables, etc. Even my decision to classify the story about this material congealment as the story of a pot sherd is completely arbitrary because I hierarchized the duration between the breakage of the vessel and the present over its magma, rock, mineral, clay, vessel, trash, or tool ontologies. The biographies of things (Kopytoff 1986) as well as their social histories

42 I am intentionally not referring to sedimentary or metamorphic processes to avoid confusion.

43 See 3.3.1 for definitions of constellations and networks of practices.

(Appadurai 1986) are therefore complex meshes bundling the trajectories of different itineraries in various temporalities. Environmental processes, production, consumption, discard, re-use, deposition, archaeological find, laboratory, museum, depo are only some of these intersecting threads that, over different temporalities, participate in the weaving of the biography of a pot sherd.

The idea of materials as palimpsests was already somewhat pointed out by Bailey (2007) with his five different categories of palimpsests: true, cumulative, spatial, temporal, and meaning. His categories already account for differential itineraries that node together; however, I propose a more radical view rooted in the palimpsestic ontology—or being—of materiality outlined above. Matter is becoming (Barad 2003, 822); mattering is the combination of "(...) complex traces of actions and inactions at some past time" (Joyce 2016, 11). I will consciously use the term materiality because it matches not only the new materialism views mentioned above but also Tim Ingold's views. In his rejection of dichotomies such as body and mind, human bodies and things, and views of the properties of materials not as attributes, the author suggests to drop the term materiality (Ingold 2007a; 2010). However, if used without dichotomies such as the "(...) physical components of the environment *and* the social practices enacted in that environment" (Jones 2004, 330),[44] or the flow of intersecting itineraries of bodies *and* objects (Cresswell 2012), then materiality can be an empowering category in archaeology (Knappett 2007; Tilley 2007). And materiality is palimpsestic; each category in Bailey's (2007) classification is actually a grid. For example, temporal palimpsests are multiple and involve different scales and rhythms.

All of the reflections outlined above demand a slightly more complex definition of archaeology than the one outlined at the beginning of this section. Archaeology can then be conceived of as the "(...) practice of *tracing* the intersections of *temporalities* of *materialities*, including those making up the *bodies* of human beings, and their congealing as sites" (Joyce 2016, 8).[45] Our chronologies cannot consist of vertical two-dimensional charts that ignore the palimpsestic ontology of materiality. Earlier chrono-narratives based on ideas that see the shape of the vessels and decorative styles, for example, as proxies for social transformations are the best example of this discrepancy between the progress in archaeological theory in the past decades and the need for revolutionizing our discipline from the bottom up, revising what we take for granted, which includes the allegiance to ceramic seriation (Rowe 1961; Marquardt 1978; Willey & Sabloff 1980) as a powerful relative dating technique. We have swum long enough in our sea of temporalities, so now might be the right time to "swim in an ocean of [palimpsestic] materials" (Ingold 2007a, 7).

3.3 INCORPORATED HISTORIES

A chronological effort rooted in the palimpsestic ontology of materialities faces many paradigmatic obstacles. I use the term paradigm in Giorgio Agamben's sense (Agamben 2010) and not following Kuhn's view (Kuhn 2004; Donner 2015, 72-82), and I propose that chronology building in archaeology is a paradigm in and of itself. This paradigm has remained unchanged in spite of a long history of development of archaeological theory, which is evinced by the simple fact that chronological charts have remained conceptually unchanged. New data is constantly added, but the geometrical construct of time stays graphically and therefore metaphorically unquestioned.

In order to fully analyze this paradigm, it would be necessary to carry out a thorough discursive analysis, which would entail five different aspects. First, an evaluation of its discursive formations, understood as the principles that govern our chronological discourse. Second, the enunciation of its general rules, such as the conceptions of time, the Cartesian expression of chronological charts, or the view of absolute dates as points. Third, the study of the surfaces of emergence, which refer to the conditions (historical, paradigmatic, discursive) in which objects of discourse arise. Then, the authorities of delimitation, which would assess who the legitimized agents are that establish the objects of discourse; and finally the grids of specification, or the systems of chronological classifications (Foucault 2005). However, that would be the purpose of another manuscript. Therefore, I will focus on articulating the relationship among certain objects of discourse, such as materiality, embodiment, practice, *chaîne opératoire*, biographies of things, communities,

44 The emphasis is mine.
45 The emphasis is mine.

constellations, and networks of practices, style, and chronology into a different paradigm. This discourse formation with its own units, modalities, rules, and relationships reflects on the conceptualization and representation of time in archaeological practice from fieldwork to literature.

3.3.1 WE MATTER

So far, I have talked about materiality at a distance; although I have tried not to dichotomize body and mind, I have not yet sufficiently addressed our corporeal—and hence material—ontology as humans. We do not exist on 'the other side' of materiality, our form, as the form of all other things, "(...) far from having been imposed from without upon an inert substrate, arise and are borne along (...) within this current of materials" (Ingold 2007a, 11). We, people, "(...) are present (...) in the same way that all living organisms are, as complex bundles constituted by the flows and transformations of materials across the interface between their bodily substances, and the media that surround them" (Ingold 2007b, 31). As we occur and unfold, as along with the other "bundles" we intersect with—and forgetting one of our first indoctrinations that splits our world into living and non-living things—we are not dead and inert. In this sense, agency is not our unique resuscitating and sustaining property (Ingold 2007a; 2010) because both things and people "(...) have mutual biographies which unfold in culturally specific ways" (Gosden & Marshall 1999, 173). In this sense, structure and agency are mediated through practice, meaning that while practice is conditioned by structure, it simultaneously reshapes and reproduces structure (Dietler & Herbich 1998, 245). In Gidden's words, "(...) structure is both medium and outcome of the reproduction of practices" (Giddens 1979, 5). And since the exercise of power is material, physical, and corporeal (Foucault 1980, 57-58), our bodies, understood as the sites of our lived experience (Joyce 2005, 151), do not merely signal social structure. In fact, social structure is actually inscribed in our bodies through *habitus*, or socially and therefore historical systems of dispositions (Bourdieu 1977; 1984). These habitual practices are "(...) the articulation of embodiment that is key to understanding the lived experience of social actors and, thus, (...) the formation of different identities" (Fisher & DiPaolo Loren 2003, 228). Here, we are then speaking of ways of doing and making things, ways of bundling different itineraries of things. In this sense, materiality is embodiment; the hands of the potter shape and are shaped by clay, water, tools, and sand. The different bodily gestures and movements that ceramic production entails are inscribed in the vessel, which is an embodiment of the potter's *modus operandi*, the situated social structure, and his or her overlapping identities. Learning a craft is therefore historically and socially situated; learning how to make things is part of learning how to become a member of a community of practitioners. I understand communities of practice as "(...) a set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice" (Lave & Wenger 1991, 98), in which membership is processual. Becoming a member, the transition from newcomer to old timer, is conceptualized as legitimate peripheral participation, which is the "(...) interactive process in which the apprentice engages by simultaneously performing in several roles[,] (...) each implying a different sort of responsibility, a different set of role relations, and a different interactive involvement." (Lave & Wenger 1991, 23). Learning is then participating, both through understanding and experiencing, so it is never as simple as the transfer or assimilation of knowledge. Learning, transformation, and change are interwoven (Lave & Wenger 1991, 51-57). Therefore, tradition building, or cultural construction, is done through practice (Pauketat 2001). In the case of technical traditions, like ceramic manufacture, they constitute the "(...) arenas in which agents construct social identities and forge power relations while also producing and using utilitarian objects for practical ends" (Dobres 1999, 129). Some traditions are shared by several communities of practitioners. The microscale ways of doing might be particular to each community, but other, more macroscale practices may be common to all. Constellations of practices may result from collective historical roots, artifacts, conditions, members, resources, geographic proximity, interaction, or overlapping styles/discourses (Roddick 2009, 80). The bundling of constellations of practices, such as those at the community level, can be intentional or unintended (Joyce 2004; Roddick 2009). Another way in which communities and constellations of practices bundle together is through networks, which aim to understand the "(...) local histories at least in part through understanding relationships between places (and the people and significant things in different places), rather than by

attempting to trace and delimit territories as frames for localized, essentialized identities" (Joyce 2020). In these networks, nodes comprised of a combination of places, people, and time connect through flowing relationships (Joyce 2020).

In order to define a community of practitioners of pottery manufacture, it is necessary to dissect the ways of making things, which can be broken down into different steps that are followed to achieve a desired end product.[46] Accordingly, the operational sequence is defined as "(...) a series of operations that transforms *raw* materials into an *end* product, which is an object of consumption or a tool" (Creswell 1976, 13).[47] Similarly, Sillar and Tite (2000, 4) characterize it as a sequence of techniques to modify *raw* materials into a *final* product.

These definitions are by no means simple; even though they try to make a common-sense statement saying that to make something, you have to follow certain steps, they are also reproducing several of the notions regarding materiality that we have discussed above. To begin with, raw materials are opposed to the end or final products, instead of describing a becoming in which stone, hammer, hand, arm, gravity, sand, water all unfold into an axe. Raw materials are reduced as a source for creating something completely different, denying the previous histories that intersect. The processual ontology of manufacturing practices and the histories both before and after the production process are denied. Second, in these definitions of *chaîne opératoire,* humans are completely absent. For instance, in the first characterization, the subject of the sentence, the agent that transforms raw materials into a final product, is the series of operations. Human agency is reduced to operations and techniques to explain how things come into being. Finally, production and consumption are dichotomized (but see Borck & Mills 2017, 29-30). Even highly lucid approaches to ceramics, like Roddick's work in the Taraco peninsula in Bolivia (Roddick & Hastorf 2010), does not escape this problem. For the author, pottery production is "(...) a bodily practice, in which the subtle cultural choices in production are seen in changing paste recipes, firing patterns and surface finishes" (Roddick & Hastorf 2010, 159), while food preparation and consumption are "(...) also embodied and highly routinized; [they are] truly the most common bodily and social act, being both discursive and non-discursive" (Roddick & Hastorf 2010, 159). These trajectories of pottery manufacture, food preparation, and consumption presented by Roddick and Hastorf (2010) are parallel; they do not seem to intertwine. However, in practice, they do all the time; for example, the introduction of new vessel shapes, or the knowledge that certain tempering materials can aid in thermal shock resistance, and the choice to copy certain decorative techniques, not only transform the sequence of steps followed in pottery manufacture, but also have implications in culinary practices, differential foci of geological surveys, and other socially lived experiences.

As a field archaeologist, my own dichotomies between production and consumption were challenged during my first season in the valley of Juigalpa, in early 2015. In the course of the pedestrian survey, we interviewed many local residents and asked about potters in the region. This ethnoarchaeological effort led us to Antonia Villegas, a 68-year-old healer living in the San Isidro locality, just east of Aguas Buenas, across *La Garnacha* stream. She explained to me how she learned to make pots from her mother-in-law, who was a *locera*, and that she had not made a single vessel for the past twenty years.[48] The practice, which was never intended as a fulltime job for her, was abandoned for several reasons. First, the replacement of fired clay vessels with plastic and metallic ware; second, the resilience of her treasured big *cantaros*, where she stores water because they keep it cooler than vessels made of other materials; and the availability of cheap *comales* and *ollas* at the market in Juigalpa. After explaining the manufacturing process that she learned from her mother-in-law, Antonia told me how she used to fire big pots in an outside hearth, in the open, while she employed her stove—also made of clay, as the kitchen structure, both built with her own hands—for firing smaller vessels. Suddenly, the separation between production and consumption contexts and practices seemed trivial, and even though household production and consumption are widely reported worldwide (Hirth 2009), somehow their dichotomization creates a disconnected view of these practices, denying their intersecting trajectories. The same fallacy occurs when we conceive of potters

46 For a thorough discussion regarding the history of the concept of *chaîne opératoire*, see Delage (2017).

47 Translation and italics are mine.

48 In central Nicaragua, potters are known as *loceros* because they produce *loza*, which means "ware" in English.

as only potters, even though their lived experience usually entails and has entailed intermittent, multi, and inter crafting activities (Shimada 2007; Hirth 2009; Fredriksen *et al.* 2014). Classifying practices and crafters is a common disciplinary tool; however, assuming an automatic separation as a direct consequence of their definition is problematic.

For the purposes of this book, I will focus more on production-related practices, which will be linked to other trajectories of our pot sherds to avoid losing the bigger picture. However, a dive into ceramic manufacturing processes without taking into account the "end" product with its morphometric and decorative characteristics would be incomplete, so I will address these topics as well.

3.3.2 STYLE AS THE UNIVERSE OF WHAT IS POSSIBLE

The trajectories of steps required to make things are numerous.[49] These choices[50] consist of the socially acquired dispositions (Bourdieu 1977) that both enable and constrain the perceptions of what is possible (Dietler & Herbich 1994) regarding all itineraries of the pot's life, including the different steps in its manufacture, the embodied aesthetics of the final product, and the next stages in its biography. Crafters learn the realm of these possibilities, which are socially and historically situated, during the process undertaken in order to become part of the communities of practitioners of pottery manufacture. This learning process, as characterized above, is called legitimate peripheral participation, and it consists in the acquisition of skills related to the routinized and often unconscious situated bodily gestures of doing things (Sackett 1977; Wiessner 1985). Style in this sense is defined by what is possible, so in a way it has a very similar trajectory to discourse, understood as enunciates subjected to a set of rules that define the regime of objects (Foucault 2005). A discourse delimits what is said, how it is said, and what is included in and excluded from what is being said. Style, then, constrains and enables what is done, how it is done, what is included in and excluded from what is being done; it is a non-dichotomous intersection of practices of bodily incorporation and inscription (Connerton 1989).

Since everything is discursive, style is the articulation of some aspects of social structure. From an archaeologist's point of view, style can then be conceived as "(...) the manifest expression, on the behavioral level, of cultural patterning that is usually neither cognitively known nor even knowable by members of a cultural community" (Lechtman 1977, 4). Therefore, style is inherent in all variation (Sackett 1977, 378), but contrary to its first conceptualizations (Sackett 1982, 154), it is not a direct diagnostic of ethnicity. Rather, it can also be related to information exchange (Wobst 1977), and it is therefore not reduced to aesthetic choices. Also, there is not necessarily a division between function and style, as outlined by Wiessner (1985). In fact, ethnoarchaeological studies suggest that variability in material culture patternings is related to the arbitrariness in technological gestures (Stark 1998, 5-6). Consequently, the traditional dichotomy between style and function, which equates the former with decoration and micromorphological features, is not conclusive. Artifact variability is actually related to technical choices (production) and to consumption choices (Gosselain 1998; Stark 1998), so it does not directly signal identity either. In fact, equating style to culture is a simplistic approach (Wobst 1977, 328). Style "(...) is to be located in those attributes of objects that have no discernible role in affecting their utilitarian performance in the context of use (the domain of function) and that do not result from technical constraints in the context of their manufacture (the domain of technology)" (Dietler & Herbich 1998, 237). Despite these many critiques, the fundamental building blocks of most chronological endeavours based on ceramics, at least for pre-Hispanic Nicaragua, have been built upon decoration and formal variation (see Chapter 2). That is to say that variability in these two aspects was interpreted as a proxy for social transformations (see Geurds & van Broekhoven 2010 for an alternative interpretation).

Ethnoarchaeological work in subSaharan Africa established two decades ago that the steps of the manufacturing process that do not imply specific motor habits and are performed in the open might invite collaboration among potters and other social actors, so stages in the production process such as decoration, clay processing, firing, and perspiring constitute moments in which new ideas and attitudes can be adopted, regardless of the level of training of the potter (Gosselain 1998). On the contrary, techniques used for fashioning the vessels are more resistant

49 See 3.3.3 for a full description of the ceramic production process.

50 Choice is addressed here in a non-idealistic way (Binford 1989).

to change, probably because they do essentially rely on motor habits (see Arnold 1981; 1985, 235-237; 1989; Foster 1965; Nicklin 1971). Moreover, they are associated with one of the most personal and least symbolically invested operations of the *chaîne opératoire*. These reasons may explain their frequent correlation with larger and more pervasive forms of social ties, such as linguistic affiliation" (Gosselain 1998, 102). Concurrently, the anthropology of technology approach, as proposed by Lemmonier "(...) is the study of the relationships between technological systems and society" (Lemonnier 1989, 156), taking into account not only the reciprocal effects between technological and social systems, but also the physical aspects of material culture. However, this focus on technological systems might represent a bias from our own Western culture, in which technology and society are viewed as oppositional (Hegmon 1998, 156).

Without getting into the debate currently surrounding ethnoarchaeological work in ceramic production (Gosselain 2016; Roux 2018), in my opinion, its greatest contribution is the realization that the borders of territories and groups—which include temporal borders—although clearly important to people, are not necessarily reflected in the distribution of ceramic styles as conceptualized by archaeologists (Gelbert 2003); the boundaries of style zones can fall in areas which are of no cultural or social significance and sometimes relate more to networks of personal interaction among potters, implying face-to-face situations (Dietler & Herbich 1994, 469). Therefore, an "(...) integrated view of material style encompassing patterning in technological, formal, and decorative aspects" (Dietler & Herbich 1998, 238) is more suitable for understanding variability than the focus on arbitrary formal characteristics. To summarize, style is habitual, corporeal, technological, socially and temporally situated; style is what is accepted as the norm, as the proxy, as how things should be done and what they should look like. Style signates the bodily gestures of the potter and also the manner in which the food or drinks contained in the vessels are enjoyed. Style is a powerful category when used without reducing it to aesthetics or technology; therefore, it cannot be simplified into only decoration, shape, size, or technique. Style determines the universe of what is possible, so studying variability entails shedding light into the subtle and complex changes in many interweaving trajectories that, in their becoming, are constantly re-questioning and transforming what is it that is possible.

3.3.3 STEP BY STEP: OPERATIONAL SEQUENCE

Before describing the ceramic production process, it is important to explain what I want to mean by ceramic vessels, or sherds, which are the pieces of broken pots that archaeologists find. To do so, I will exercise some story telling, inspired by the writings of Tim Ingold (Ingold 2007a; 2007b; 2010) and partially by Holtorf (2002). The protagonist of our journey is again the pot sherd, now seen through technological eyes. As I addressed in Chapter 2, let's say our story goes back to the Late Oligocene, around 28 million years ago, when the volcanic activity of the study area started the long process that formed most of the rocks found on the surface today. The formation of these rocks provided the volcanic mineral signature for the majority of the soils that we walk on nowadays. Some of these soils became clay thanks to the combination of water, wind, sunlight, fine-grained rock, clay minerals, quartz, metal oxides, and organic matter. Clay, in turn, can become many different things; that is to say, clay *entangles*[51] many possibilities, depending on different technological flows. In this sense, clay has its own *properties* as a material. The various and often interwoven trajectories of clay can include phases in which it becomes a *surface* (i.e. the ground beneath our feet), but it can also become a *substance* (i.e. mud, house wall, kiln) (Gibson 1979; Ingold 2007a; 2007b). When its trajectory coincides with a potter who intends to make a vessel, fuel and fire, it can unfold into ceramics. If fired under specific circumstances, it will turn into porcelain. Therefore, clay is a thing that can unfold into different other things, that are still clay but only partially, because they become actually a *bundle* of many things intertwined together. In order to understand the different lines that form this bundle, I will unfold the ceramic manufacturing process to illustrate how ceramic *becomes* (rather than is) ceramic. To do so, I will follow V. Roux's conceptualization and terminology for the *chaîne opératoire* of ceramic production (Tixier 1967; Roux 2016). Literature is extensive on this topic, but the decision to follow Roux's outline is directly connected to the methodological choices described in Chapter 6, with my objective of following a practitioner's perspective (Keller

51 In Hodder's sense, meaning that clay entraps both enabling and constraining forms of dependence (Gosden 1994, 77; Hodder 2014, 20).

2001). The description of this process does not mean that ceramic manufacture depends on the presence of each step; in fact, some of them are not essential for achieving an end product but are more related to functional or cultural choices. Also, different parts of the vessel (base, body, neck, for example), can be made following different steps, so operational sequences are not linear procedures (García Rosselló & Calvo Trias 2013; Roux 2016).

Clay procurement and preparation practices

To begin with, people collect clays together with rocks, sand, bark, wood, grass, and water to make things destined to store, cook, ornament, produce sound, weave fabrics, polish other things, etc. We will refer to this stage of the process as procurement practices, in which humans walk, navigate, collect, and transport certain things. Acquiring the materials can be done on the surface, through excavations, or on the beds of rivers, streams, and creeks. Even though initially it was thought that raw material procurement was guided mostly by certain proximity economic reasons (Arnold 1985), extensive ethnoarchaeological work has established that it is more related to habitual practices than previously thought (Gosselain & Livingstone Smith 2005).

Then, clay preparation practices are divided in two different groups. The first one concerns the modification of the argillaceous materials, which includes the fragmentation, sorting granularity (either dry or wet), hydration, withdrawal of inclusions, addition of temper, or mixing of clays. Second, the homogenization of the paste comprises kneading, mixing, and maturation. Then, paste recipe preparation is a process that involves the removal and addition of materials within the clay paste to configure a particular clay/inclusion/water compound. Fragmentation aims to reduce the clay mass to homogenous structural entities with similar hydration capabilities; the clay recipe is usually dried, then crushed and pulverized. Sorting usually involves the removal of certain particles, such as naturally occurring coarser inclusions, organic matter, and minerals that can affect the pots during firing like calcite or mica, among other "impurities". The withdrawing of these materials may include drying, crushing, grinding, winnowing and can be undertaken: by hand (usually wet clay), which involves manipulating the clay and detecting with the fingers the unwanted elements; by dry sieving, with the employment of organic and inorganic sieves; by liquid sieving (also called settling), which entails levigation or simple soaking and stirring techniques (Rye 1981; Shepard 1985; Sinopoli 1991; Rice 2005; Orton & Hughes 2013; Roux 2016).

Temper can also be referred to as inclusions, aplastics, non-plastics, additives, modifiers, fillers, aggregates, etc. They consist of geological, organic, and/or cultural particles which are added to the clay in order to improve workability, to achieve certain effects in the end product, or just because it is habitual. Also, tempers can be added as a byproduct of the manufacturing process, meaning by accidental addition related to working surfaces or tools (Rice 2005). In general, purposefully-added tempers can then be divided into two main groups, depending on the desired effect (Roux 2016): a) to adjust plasticity for shaping and drying, plastic agents are added to rigid clays and vice versa; b) to regulate mechanical and thermal shock (for example, increasing pore volume makes the pot more resistant to mechanical stress, as well as fast temperature changes, improving heating transfer, water percolation, and evaporation) (Sinopoli 1991; Rice 2005; Orton & Hughes 2013; Roux 2016). Also, adding temper reduces shrinkage (Jacobs 1983; Shepard 1985). Additionally, sometimes different clays with complementary properties are combined. For example, a clay that is too sticky but has good plasticity may be mixed with one that is less plastic but not sticky, for example. Also, a widely available clay can be mixed with a less accessible one (Shepard 1985; Roux 2016).

The homogenization of the clay involves its systematic manipulation to discard air pockets and clay lumps; to homogenize the distribution of inclusions and water content; and to increase the clay's workability (Rice 2005). There are many ways to process the clay recipe, and they can be complementary rather than mutually exclusive. Wedging consists of slicing wet clay with a fine wire several times and remixing the segments or slamming clay onto a smooth hard surface (Rice 2005). Hand kneading applies bodily gestures similar to the ones used when processing edible doughs. Pestle kneading has the same effect as hand kneading but uses a *mano* instead of human hands. Foot treading is usually employed in the case of larger scale production, when pressure is applied with the heels for faster processing or larger amounts of clay. Wedging, kneading and treading aid in the homogeneous incorporation of non-plastic particles, water content, elimination of voids and minimization of pores. Maturing consists of storing wet clay

material to accelerate enzyme production, which optimizes hydration and plasticity (Roux 2016).

Fashioning

Fashioning involves different methods, techniques, procedures, gestures, and tools. A method is defined as "(...) an ordered sequence of functional operations executed through a set of elementary gestures that can be performed using different techniques" (Roux 2016, 63). A technique is characterized as "(...) a series of physical modalities according to which raw materials are transformed" (Roux 2016, 64). Phases describe the different fashioning techniques applied to the various parts of the vessel. To achieve the end product, there are two successive stages: first, the rough-out, when the "hollow volume" does not feature the final geometric characteristics, and then the pre-forming, which takes place when after those properties have already been achieved. For each technique, we will follow Roux (2016) on her division according to the source of energy (muscular or no rotary kinetic energy opposed to rotary kinetic energy). Also, we will split them according to the two types of forces applied: pressure and percussion. Regarding the hydration state of clay, I will refer to wet clay when it is plastic and to leather hard clay when, after drying, the clay still conserves the ability to be deformed. Additionally, when referring to tools, we make the basic distinction between active, passive, and rotative tools. Active tools consist of those held by potters with their hands, and they are subdivided into pressure tools, applied on wet clay, and percussion tools, usually employed on wet clay but sometimes also on leather hard clay. Flat surfaces, supports and molds would be examples of passive tools; whereas rotative devices (the tournette and the wheel) allow potters to continuously rotate vessels (Roux 2016).[52]

Roughing out can be done either from a mass of clay or from assembled elements: coils, which imply pressure and then pinching, crushing, and/or drawing; or slabs using percussion. In order to perform these tasks, it is necessary to use tools, which are divided into active (hands, scraper), passive (supports, concave molds), or instruments (rotative devices). Coils and slabs can be combined during the formation of one vessel; for example, a circular slab can be used for the base, while the body of the vessel might be coiled. Additionally, the different elements can be "glued" with *barbotine*, a clay solution. These operations of attaching multiple components, whether or not they involve *barbotine*, are referred to as assemblage according to García Roselló and Calvo Trias (2013, 53). When roughing out is done from a mass of clay, it is classified as modeling when pressure is applied through pinching and drawing, so the only tools employed are the hands and fingers. Molding or hammering, by contrast, are characterized by the use of percussion as the main force. In the case of hammering on wet clay, hands, fingers, and other active tools can be employed, while mats or anvils can be used as support. In turn, molding uses hands, percutors, and rolls as active tools, as well as molds (concave, convex, horizontal, vertical, mobile, fixed, with or without handles) (Roux 2016).

Pre-forming can be done in seven different ways, depending if the clay is wet or in a leather hard hygronomic state. If wet, it can be performed by pressure either through scraping or discontinuous pressure, or by percussion through beating. When the clay is leather hard, it can be worked with pressure through *repoussage*, which implies pushing against the internal wall of the vessel applying a vertical movement to thin and curve the walls, using a hand to support the external wall and a tool to perform the pushing gesture. A second technique that applies pressure in a leather hard clay state is shaving, which uses a sharp active tool and a mandrel or some similar surface as a passive tool. Additionally, two techniques can be applied on this same hygronomic state. First, paddling, which consists of applying force through a tool perpendicular to the external walls of the vessel or the base; and second, *martelage*, which involves similar gestures to paddling, but with the difference that percussion force is applied to the internal walls of the vessels, or their base. The main difference between paddling and *martelage* is that the second technique does not require the use of a "counter-beater" (Roux 2016).

Finishing

Finishing operations are executed after fashioning and before surface treatment or decoration, and they consist of the modification of the superficial layer of the paste for its homogenization (Roux 2016, 125). Three different techniques have been characterized: wet clay smoothing, which is based on pressure that

52 Since my dataset lacks vessels fashioned with rotative devices (see Chapter 7), I will not define or describe the techniques related to them. For a thorough overview, see Roux (2016, 101-124).

can be either discontinuous or continuous (when a rotative support is used) with the application of active tools; *brossage*, which consists of rubbing the paste with a hard re-hydrated tool, in order to homogenize the surface of the vessel; and leather hard clay smoothing, which is similar to the latter but with the application of a flexible tool (Roux 2016).

Surface treatment

The different treatments of the surface of the vessels imply the transformation of the external layer of the recipients, performed after finishing operations. There are two main divisions within surface treatments: those techniques that involve friction and those that consist of coating. Once the vessel is either in a leather hard clay state or dry, it can be subjected to friction in order to create a compact external layer. *Doucissage* consists of friction gestures applied with a rigid tool that is constantly re-hydrated, while burnishing is when rubbing is done on leather hard clay or dry clay with a hard tool without the addition of water. Polishing is similar to burnishing but is performed with a flexible tool (Roux 2016). Coating can imply the addition of more or less liquid argillaceous materials (*barbotine*, *crepissage*, *engobe*); the application of coatings made of organic materials, including graphite; or glazing, which implies the application of a layer of vitreous materials fused with the ceramics at high temperatures that are rapidly cooled for retaining some of their liquid characteristics (Rye 1981, 98). Finally, smoking consists of exposition to fire in order to achieve a black or gray surface color that can also aid in impermeabilization (Roux 2016).

Decoration

Decorative techniques have ornamental purposes but are sometimes also functional and comprise painting—which can be negative—impressions (punctuated impression, impression *basculée*, rolled impression, stamping, impression by beating), incisions (punctuation, rotative, scraping, and engraving), excisions, application of elements (appliqués), and modelled decorations (Roux 2016).

Drying

Progressive drying is important to avoid cracks, fissures, and collapse during firing. Its duration is variable, depending on the climate of the place of production (Roux 2016).

Firing

During firing, vessels acquire irreversible physicochemical properties; temperature, duration, heating speed, and atmosphere extremely affect the results. Roux distinguishes two main types of firing techniques: those in which the vessels are in direct contact with the fuel and other recipients and those in which there is no contact with the fuel (Roux 2016, 151). Within the first group, she includes open firing and furnaces; the second group encompasses firing structures that have a combustion chamber separated from another chamber where the vessels are positioned (Roux 2016).

Post-firing techniques involving the application of organic materials while the pot is still hot, such as coal tar, calcite washes (also done before firing), or tree resins, can be performed in order to improve the vessel's appearance, decrease permeability, and possibly increase strength (Rye 1981).

The description of these many possibilities within the process of ceramic manufacture leads us to question the mechanisms through which potters, and more precisely, groups of potters "choose" from the different available steps. And the question of the availability of these steps is crucial; can potters really choose from all of these variables? What mechanisms operate in this "selection" process? How does this universe of what is possible unfold?

3.4 TOWARDS VIBRANT CHRONOLOGIES

The histories of the different trajectories of what is possible, of what is habitual, are histories of power, of the incorporation of social structure in our physical body, leaving traces in our bones, which in turn leave traces in what we make. The palimpsestic ontology of materiality (body, bone, vessel, architecture, for example) goes beyond Cartesian dichotomies; materiality is the bundling of unfolding traces. Therefore, archaeological narratives can no longer rely on only two variables: time-space and pottery styles. A single itinerary (pottery) does not and cannot account for the whole picture, and indeed there is no single big picture, because every time we zoom out, more bundles appear. And this kind of complexity does not necessarily imply the impossibility of generating knowledge; it just makes us aware of the reductionisms, which are not only

temporal, that are present within the archaeological paradigm of chronologies.

I look outside my window, and I see the Van Steenis building at the Faculty of Archaeology, in Leiden University, The Netherlands. I see what looks like iron structures painted in a grayish blue, I see glass, I see trees, and I see a lot of bricks painted white. On blue sky days, the glasses reflect bright colors; on cloudy days like today, the glasses look more gloomy. On rainy days, the drops distract me from my writing with the noise they make when they bump into my window. It is autumn, so the beautiful tree in the backyard is starting to lose its green color, and its leaves are turning yellow. When I go downtown, my universe is different; it turns into a reddish brown world, due to the unpainted iron-rich bricks commonly employed in construction; it is ovally criss-crossed by water canals, trees, flowers, bridges, seagulls, ducks, gangs of angry swans who monopolize the looting of public trash cans, bicycles, murderous buses, the song that the clock at the City Hall building sings every hour or so, the smell of fried food, people, shops, houses, etc. Chronological narratives should include these kinds of descriptive exercises; the archaeological record is rich in multiple palimpsests of the constantly unfolding worlds of materials, and we should take up the imaginative challenge to narrate it.

I therefore conceive archaeological chronologies as the *vital* and *vibrant* bundling of the different itineraries of practices, viewed beyond "(...) the onto-theological binaries of life/matter, human/animal, will/determination, and organic/inorganic" (Bennett 2010, X). In our case study, the valley of Juigalpa, these practices entail, for instance, mound construction, ceramic and lithic artifact manufacture, foodways, participation in constellations and networks of practices, spatial configurations within sites, etc. Each variable has its own history intertwined with the histories of other variables. Chronology does not equal the study of variation, but rather how the trajectories of each practice interweave through time-space. And each variable in of itself is formed by multiple trajectories of other itineraries. There are no phases, periods, or horizons, but rather processes. Even our valley is processual; it is not our starting *point*, it is the unfolding of geological, geochemical, atmospheric, seasonal, and numerous other processes that allow us to make an abstraction such as the valley of Juigalpa as a time-space "unit". And what we look at is actually its unfolding, its becoming, not a frozen picture taken at a certain moment, because the profiles of our own archaeological excavations are also processual. Chronologies are animated, they should be narratives of everyday experiences, full of *life*, power, and conflict, and not descriptions of the formal aspects of pots. I want to read about how the biographies of those vessels connect with the biographies of other things. I want to read a chronology and think of the person who made that plate, of what was eaten on it, what plants and animals were grown, harvested, collected, and hunted to produce such meals; if people prefered boiling, steaming, or roasting; if everyone ate from small individual containers or whether there were bigger communal dishes; if rains were heavier or the weather was drier than today; if volcanic eruptions were part of the universe of possibilities; I want to know where I found that plate fragment and why. I want to know what the world where it was produced and/or used looked like.

Back within our valley of Juigalpa, let's take our first example, mound construction, and let's assume that these structures were foundations of something similar to what nowadays we know as a house in Western culture. The practice of finding and modifying shelter, of using stuff to build things, the bodily gestures of digging and erecting structures is hardly unique to humans; every landscape is a symphony of different species and their homes. For humans, this practice does not directly imply sedentarism or agriculture (Flannery 1972; 1995; Bender 1978); in our example it only suggests the employment of non-perishable materials that allows us to account for ancient architectural efforts. Previous earthen mounds might have been constructed, but winds, rain, and erosion made sure they are not observable to us anymore. Therefore, we can state that there was indeed an intention to build, and that this intention was not necessarily new, but the innovation resided in the use of a combination of rock and sediment that we can still see today. The use of rock implied specific knowledge of the landscape and a particular relationship with it, which also applies to the use of sediment for construction purposes, that entailed the practice of mixing several types of soils for making foundations. Wood, clays, rocks, leaves, ash, fire, and rope are only some of the possible "ingredients" selected. We can also infer that mound builders knew that these foundations were more resistant to human and non-human actants (Latour 2005, 54) because this is something

easily observable after the first harsh rainy season in a mound's biography. Therefore, I do not interpret the perennial characteristic of these structures as an unintended consequence. However, the houses built on top of these stable and durable foundations were constantly threatened by several enemies, including not only water but also vermin, for example. It is time now to stop for a second and think about this division that I just made between foundation and house. Even though it is somewhat arbitrary, the maintenance of wattle-and-daub walls and thatched roofs is indeed much more demanding than that of a base made of quarried bedrock fragments mixed with clay. Also, foundations can be used as surfaces for several different structures, and one foundation can "host" various houses through time. Building several structures also accounts for some sort of sense of community, of the intention of living together, of sharing a space but also of compartmentalizing it.

Mound practices entangle many more processes like the few described above. Like ceramic manufacture, building also requires certain steps to follow in order to accomplish the desired product. All habitual practices have their own situated ways of doing. Therefore, chronological narratives include genealogies of practices (Pauketat & Alt 2005; Gosselain 2018), the microhistories of several interconnected subvariables that bundle together these different practices. And my account of the trajectories of mound construction techniques and morphologies, of "village" layouts, is only the tip of the iceberg of the experiences of people who lived in a world of clay structures, who also looked through their "windows", but saw something completely different to my brief description of the view from my window at the Faculty of Archaeology at Leiden University. And that is exactly what I want to accomplish with my vital and vibrant chronologies.

4 Fieldwork methods

The fieldwork portion of this research aimed to obtain a sample of the lives of the dwellers of the valley of Juigalpa that was representative enough to allow for the composition of a chronological narrative of their experiences. In order to achieve this goal, I applied a combination of methods and techniques that were integrated into a cohesive research plan involving three separate steps. First, a systematic, high-intensity, full-coverage surface survey was conducted in a 52 sq km area, mainly north and south of the town of Juigalpa, to obtain a preliminary map assessing the distribution of the traces of human practices throughout the research area. Second, mapping of all mounded sites within a 47 sq km subarea was undertaken to better understand the interaction between humans and environment, embodied in architecturally modified sites, in combination with the data obtained during the survey regarding places lacking in visible surface architecture. In particular, special attention was given to documenting distribution, morphologies and spatial arrangements of man-made structures. Third, 52 stratigraphic pits were excavated in eighteen different sites throughout the valley. A total of 28 radiocarbon assays were dated through AMS.

The fieldwork component of this project was comprised of five different field seasons, undertaken between January 2015 and September 2016. In total, ten months were spent in the city of Juigalpa, Chontales, Nicaragua, together with a large team of collaborators that included bachelor, masters, and PhD students from universities around the world, who made the workload achievable in such a short period. All the survey and mapping data was processed by Alejandro Arteaga (2017) at the Universidad Nacional Autónoma de México. Additionally, an extra month was spent in Juigalpa in January 2017 to inventory all the materials retrieved during the excavations. Finally, a one-month study trip through Nicaragua took place in January 2018, where a survey of archaeological museums in the country was conducted. The main goal of this final survey was to create a photographic dataset allowing the comparison not only of ceramic materials, but also other types of industries between regions; to further understand the connections, continuities, and discontinuities in pre-Hispanic habitual practices among different regions.

4.1 SAMPLING STRATEGIES IN THE FIELD

Based on the discussions outlined in Chapter 2 (section 2.2.3), Aguas Buenas (AB) was chosen as the starting point for a microregional survey, and the valley of Juigalpa—where the site is situated—was therefore selected as the focus of this research. Once this decision was made, fieldwork methods were conceived as sampling strategies aimed at obtaining a representative dataset to fulfil these research objectives. In this case, the "representativeness" of the sample was conceptualized according to the debates outlined in Chapter 3, where isolated traits of ceramic vessels cannot account for the complexity and capriciousness of technological change and human experience. Therefore, sampling for this research implied answering questions tailored to help determine which archaeological sites were sufficiently relevant to excavate and which ones were not, and how this relevance could be defined.

Therefore, sampling strategies for this book did not start at the lab but were designed prior to fieldwork with the future laboratory work, along with its specific research questions, in mind. This chronology building effort did not start with excavation loci designed in response to divergent research aims and goals or with piles of sherds laying on tables at the lab, but with the questioning of which places would be more adequate to retrieve these ceramics from,

and why. Consequently, different methodological choices led to the retrieval of the material universe studied in this manuscript, and these choices are connected to but also depart from the problems inherent to lab work, where the material traces of past human communities are classified. In other words, the ceramic dataset examined in Chapter 7 was a direct product of sampling different archaeological contexts, in which both pre-Hispanic and post-contact pottery fragments were collected.

Sampling is defined as "(...) the science of controlling and measuring the reliability of information through the theory of probability" (Binford 1964, 427); simply put, choosing elements from a larger population or universe of elements to allow the formulation of inferences applicable to the population as a whole (Drennan 2009, 80). In line with this, the terms population and universe refer to a well-defined set of objects and to sample then means to select objects from this well-defined population (Schumacker & Tomek 2013, 43). Apart from that, there are different types of sampling strategies:

1. **Probabilistic sampling**, in which "(...) every unit in the set (population) has an equal probability to be selected for the sample" (Lee Abbott & McKinney 2012, 105). Consequently, these units are representative of the studied population, and the way of selecting these units from the population will determine the type of probabilistic sampling:
    a) *Simple Random Sampling*: all units of the population are included, so they share the same chances of being chosen.
    b) *Systematic Random Sampling*: similar to the first, but with an additional step in which the first unit is selected randomly and then every other unit is systematically selected.
    c) *Stratified Random Sampling*: when the study is more complex and several variables need to be taken into account, first groups are created according to these variables, and then random sampling is applied.
    d) *Cluster Sampling*: instead of the unit, the starting point consists of groups of units, to which a random sampling is applied. Since not all clusters necessarily have the same size, the method called Probability Proportional to Size (PSS) is applied. This method calculates a fraction related to the size of the sample in order to establish sampling (Lee Abbott & McKinney 2012).
2. **Non Probabilistic Sampling:** this strategy cannot be used in order to produce generalizations about a population since its representativeness is not guaranteed. There are several types of non-probabilistic sampling:
    a. *Convenience Sampling*: it is not really a sampling strategy because groups of units are used to make generalizations but are not a representative sample of a universe.
    b. *Quota Sampling*: it is similar to Stratified Random Sampling, but in this case the sample is not selected randomly.
    c. Snowball sampling: also not representative of the whole population, since units—in this case individuals—refer to other individuals for the survey (Lee Abbott & McKinney 2012).

In order to avoid a biased sample, which would invalidate this study (Drennan 2009) and would also result in the same problems faced by previous authors in the area (Gorin 1990), the methodological approach of this research consisted in a complete research in the statistical sense. Therefore, all units of the studied population were initially included (Blom 1989).[53] However, the research process through which the universe of materials to be studied was designed comprised various steps that combined different sampling strategies. Consequently, the methodological steps that were carried out in the field started up with a surface survey, followed by mapping of mounded sites, and stratigraphic excavations—which correspond to Stratified Random Sampling and Cluster Sampling strategies.

53 See Chapter 6 for a detailed account of laboratory sampling techniques.

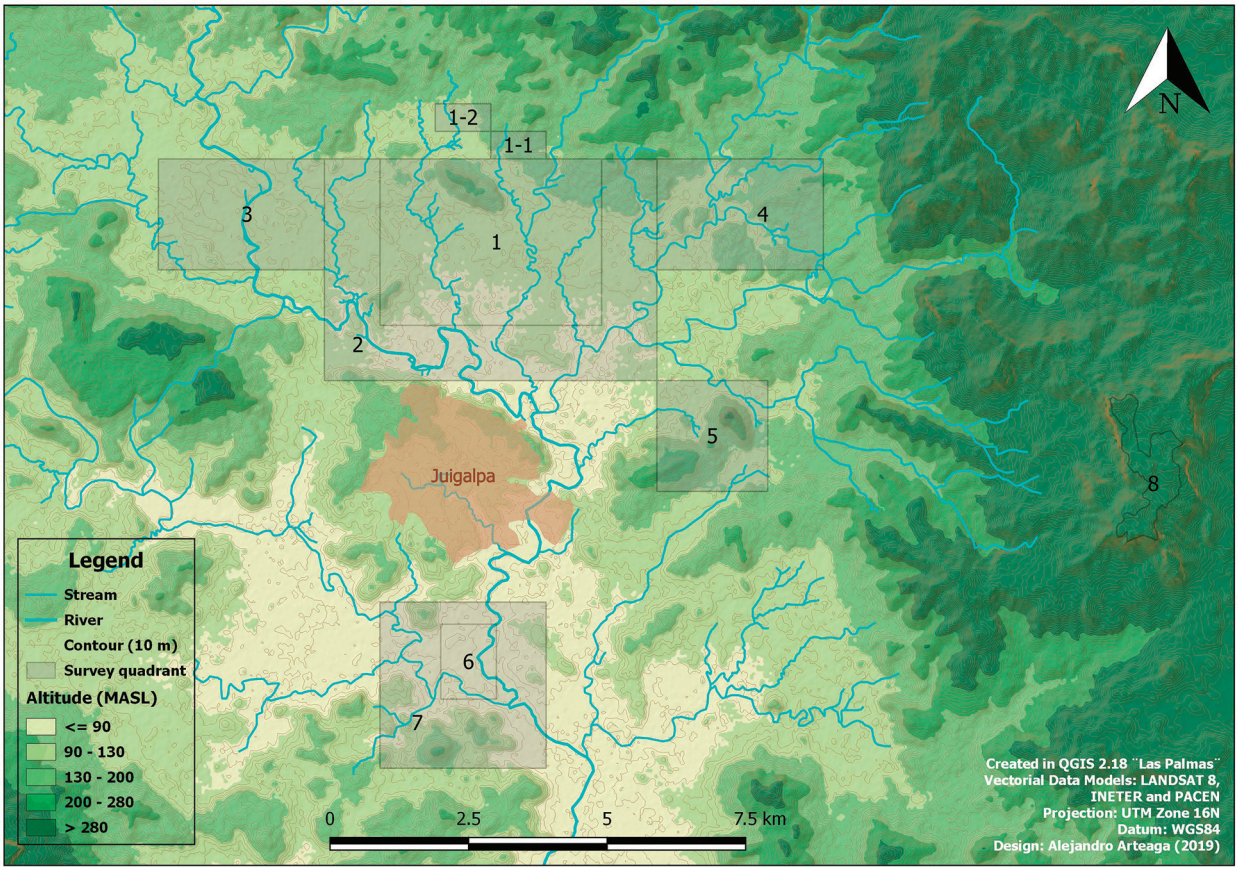


Figure 12: Map of the research area showing the different survey quadrants (credit: Alejandro Arteaga).

4.1.1 SYSTEMATIC SURFACE SURVEY

Survey areas

This section of the study consisted of a pilot reconnaissance of the research area, for which a surface survey was conducted in the valley of Juigalpa, surrounded by the Cordillera de Amerrisque. The first stage of the pilot survey, conducted in February 2015, took place in an arbitrary 12 sq kilometer rectangle around and to the south of Aguas Buenas (Quadrant 1, UTM E 6 76 000 m - 6 80 000 m / N 13 41 000 m - 13 44 000 m, see **figure 12**). Two random survey extensions to the north, of 0.5 sq km each, were added in order to include a sample of the highlands that seemed to serve as a natural northern boundary of Aguas Buenas. The preliminary results of this first pilot survey confirmed the hypothesis—outlined in Chapter 2—that the general settlement patterns view of this region was biased by the survey methodologies applied in past projects. In particular, Gorin and Rigat (1988) stated that ancient settlements were circumscribed to the margins of the rivers. However, an overview of the first lines of evidence identified after this first pilot survey suggested otherwise. Settlements not located next to the rivers were omitted by this previous research (Gorin & Rigat 1988; Gorin 1990) due to the simple fact that survey transects were restricted to the river margins, excluding other geomorphological settings. Consequently, even though the survey area proposed for this study was indeed a river subbasin, it would include different elements of the local landscape, such as plains, low hills, hills (El Monte, Guarumo, María Dominga), mounts and ridges (Cerro de La Cruz, Cerro Aguas Calientes, Güegüestepe).

Additionally, previously known archaeological data was also taken into account, so the area around La Pachona was integrated so as to combine research methodologies and scopes with Vlaskamp's sub-project at PACEN as well as with Gorin's (1990) results, which were partially based on excavations at La Pachona. In total, the rest of the research area was divided into seven different survey quadrants (numbered 2 through 8). Quadrant 2 consisted of an extension of the survey to the area immediately surrounding Aguas Buenas in a U-shape, UTM coordinates E 6 75 000 m / 6 76 000 m – N 13 41 000 m / 13 44 000 m; E 6 75 000 m / 6 81 000 m – N 13 40 000 m / 13 41 000 m; E 6 80 000 m / 6 81 000 m – N 13 41 000 m / 13 44 000 m. The main goal of this section was to study the distribution of traces of human practices with special attention on continuities and discontinuities of the patterns identified within Aguas Buenas' immediate surroundings.

In order to grasp settlement dynamics throughout the different river basins in the region, systematic survey was conducted in Quadrants 3, 4, 6, and 7. Quadrant 3 consisted of an extension towards the west (UTM coordinates E 6 72 000 m / 6 75 000 m – N 13 42 000 m / 13 44 000 m) in order to include the Mayales river banks. Quadrant 4, on the other hand, is an expansion to the east, towards the Carca stream, UTM coordinates E 6 81 000 m / 6 84 000 m – N 13 42 000 m / 13 44 000 m. Quadrants 6 and 7 were located south of the Juigalpa valley, and they were designed to encompass the El Cóbano community, which includes the Cuisalá river, UTM coordinates E 6 76 000 m / 79 000 m – N 13 33 000 m / 13 36 000 m.

For outlining Quadrants 5 and 6, other factors were taken into account, such as topographic markers, different altimetries, testimonies by locals for Cerro de la Cruz, and previous archaeological reports concerning Cerro Los Andes (Gorin 1990; Geurds 2009). Quadrant 5 consisted of a survey around and on top of the Cerro de la Cruz, UTM coordinates E 6 81 000 m / 83 000 m – N 13 38 000 m / 13 40 000 m, 230 m.a.s.l. Locals share stories about Cerro de La Cruz, which include elves living at its top, the existence of a magical border dividing our world from the supernatural one, narratives about losing the ability to find the way back home and to speak, as well as the mysterious disappearance of people and or/their belongings. Even though these stories are not directly or necessarily related to the mounds present on the top of the mountain, locals are aware of the archaeological evidence as well. Finally, Quadrant 8, UTM coordinates UTM E 6 89 822m – N 13 37 332 m (central point), was the last section chosen for survey, which was included to encompass all the geomorphological units within the research area, including the Amerrisque mountains. This portion of the survey, Cerro Los Andes, featured the highest elevation (approximately 800 m.a.s.l.) and was relevant to our research because it supposedly corresponds to the earliest phases defined by Gorin (1990). In sum, the systematic pedestrian survey covered an area of 52 sq km, in an attempt to achieve a microregional perspective for the valley of Juigalpa. Therefore, both margins of the Mayales river shores were included, as well as the Carca permanent stream and the Cuisala river. Different altitudes were incorporated into the sample as well.

As mentioned above, the main goal of the surface survey consisted of the systematic recording of all traces of human practices visible on the surface within the research area, so as to later design a solid sampling strategy to select excavation loci for redefining the local chronology. Consequently, the methodology applied included a pedestrian survey,

- of total coverage (Kowaleski & Fish 1990; Stark & Showalter 1990; Donner & Hernández Arana 2011; Donner *et al.* 2018), meaning that all terrains were accessed, even those that featured dense vegetation or other physical obstacles. In case of such reduced access, transects were walked at a 40-meter distance between team members, grouping them in couples to warrant safety and efficiency. Landowners provided access to all of their lots, so total coverage was achieved;
- of high-intensity (Stark & Showalter 1990; Donner & Hernández Arana 2011; Donner *et al.* 2018). Team members walked straight lines with a 20-meter distance between them, to ensure a detailed inspection of the surface.[54]

Data was recorded using hand Global Positioning System (GPS) devices, which used the World Geodetic System 1984 (WGS84) to georeference finds. A GPS point was taken for all mounds, surface

54 The distance between team members was calculated in relation to the average mound diameter in the research area, which generally does not exceed 10 meters. Walking with 20 meter gaps then ensures a sufficient rate of parallel visibility necessary for optimal identification of surface archaeological materials (Stark & Garraty 2008).

scatters (ceramics, chipped stone, ground stone), petroglyphs, sculptures, basalt columns, mortars, and fossils. All observable landscape modifications, such as stone alignments, roads, or pathways, were also recorded. All artifacts, mounds, and surface scatters were photographed, but surface materials were not collected. Apart from the digital recording methods, a table was filled out by each team member in a notebook, which contained waypoint number, easting and northing coordinates (UTM), picture number, find category, date, and observations. Specific codes were utilized for each artifact category to allow fast, systematic recording (see Donner *et al.* 2018). During these preliminary stages of the research, characterization of materials was done in relation to raw materials (i.e. ceramics and rock), combined with technology and end product (chipped stone, ground stone, petroglyphs, sculpture). Also, every occurrence of surface material was classified as a "scatter", and every anthropogenic elevation was called a "mound".

Surface survey data processing and analysis was undertaken by Alejandro Arteaga (2017), using ArcGIS to create different layers for each type of find. Accordingly, observation and analysis of the differential distribution and interrelationships between surface materials—but also incorporating topography and water sources, for example—allowed for the formulation of distribution patterns and distances between sites, both mounded and un-mounded. For this book, observations will be centered around surface ceramics in relation to mapped and excavated sites, both by PACEN and by other projects (Gorin 1990).

4.1.2 METHDOLOGY FOR MAPPING OF MOUNDED SITES

Due to the multiplicity of surface finds, and especially the distribution of surface ceramics,[55] a decision was made to prioritize mounded sites in order to generate a map of the different places within the research area where architectural investment was recorded. This map was conceived as a necessary previous step to plan further excavations beyond the sites surrounding Aguas Buenas. In order to achieve accurate data resolution and a thorough record of the sites, the team led by Alejandro Arteaga returned to all the sites that were previously recorded during the survey in order to register, measure, and photograph every single mound. This task was also completed on foot and applied a higher intensity than the surface survey, conducting the inspections of mounded sites in walking transects separated by 5 meters (Arteaga 2017; Donner *et al.* 2018). This strategy not only allowed recording the mounds, but also other features, such as the distribution and density of surface materials and their relationship to soils and topography, among others.

Three guidelines were utilized to orient the pedestrian inspection, as follows:

1. Mound recording was conducted per land lot following the orientation of fences but avoiding a biased division of sites based on modern boundaries. Once a parcel was covered, further survey was conducted in the surrounding ones (Arteaga 2017, 92).
2. When architecture followed a certain orientation, the distribution of patterns of the mounds was used to "predict" the location of further structures that were barely visible on the surface (Arteaga 2017, 92).
3. When rivers, streams, or creeks were associated to mounds, their beds were followed on both margins (Arteaga 2017, 92).

Mounds were also recorded using a hand GPS device, with one waypoint at the center of each mound, which was named using a combination of the initials of the land owner, the lot number expressed in Roman numerals—sometimes a single landowner possessed multiple parcels—and the mound number written in Arabic numbers. In the case of mounds located on hilltops, their known name was applied for mound labeling, because these geomorphological units, such as Güegüestepe, Aguas Calientes, or Guasimosolo, are known local landmarks. Some exceptions were used when the names of landowners could not be ascertained. This coding system allowed for the creation of a database with a unique nomenclature for each mound and architectural feature, which also included photographs with scale and north arrow indicating magnetic north. Sketches were drawn to point out mound shapes, relations to surface scatters, geomorphological features, and modern modifications (i.e. roads, houses, fences).

In the beginning, mound recording was attempted using the forms specially designed by Auzina (2018) for Aguas Buenas. This template included all of the criteria necessary to answer specific questions about that particular site, such as frequency and distribution

55 See Chapter 5.1.

Mound No.	General Information			
	Site Name			
Photo No.	Land Owner			
	Date			
Camera	Team			
	Visibility			
Waypoint No.	Ground	H	M	L
	Parallel	H	M	L

Mound Measurements			Orientation	Current use of the land
Width	Min	cm		Farming
	Max	cm		Household
Height	Min	cm		Pasture
	Max	cm		Forest

Material Culture		YES	NO	
Type of Finds	Density			Detail
C	L (1-20)	M (21 - 40)	H (>40)	
CS	L (1-20)	M (21 - 40)	H (>40)	
O	L (1-20)	M (21 - 40)	H (>40)	
GS	L (1-20)	M (21 - 40)	H (>40)	
F	L (1-20)	M (21 - 40)	H (>40)	
MT	L (1-20)	M (21 - 40)	H (>40)	
Other	L (1-20)	M (21 - 40)	H (>40)	
P	YES NO	On mound	Surroundings	
BC	YES NO	On mound	Surroundings	

Mound Morphology				
Shape	Circular	Oval	Other	
Steepness	0-35°	35-55°		55-90°
Slopes	Uniform	Irregular	Pendient to:	
Top	Round	Flat: cm		
	Surface level	Elevated	Other	

Relationship to Landscape				
Adjusted to landscape feature	Floodplain hillplain	Slope riverbank	Hilltop plain	Foothill
Relative mound location	river	elevation	site-design	unidentified
Bedrock Outcrop	YES	NO	On Mound	Surroundings

Conservation Status	H	M	L	Unidentified

Undisturbed					
Anthropic	Fence Other	Road	plough	Construction	Looting
Natural	Trees	Animal burrow		Insect	Other

Construction Materials						
Composition	Stone	Stone-sediment		Sediment	Sediment-Stone	
Soil texture	Clay	Silt	Sand	Gravel	Tuff	Ash
Consistency	Sandy	Clayish	Powdery			
Color						
Rock type	Col Basalt	Ex Bedrock	R-stones	Sandstone	Limestone	Other
Stone size	Top	S (0-20cm)	M (20-40 cm)		L (>40 cm)	No stones
	Slopes	S (0-20cm)	M (20-40 cm)		L (>40 cm)	No stones
	Foot	S (0-20cm)	M (20-40 cm)		L (>40 cm)	No stones
Stone circles	YES	NO				
No. Circles:	Circle 1	full	semi	partial		N W S E
	Stone Size	S	M	L		T F S A
	Distance stones	Together	<1 m	>1 m		
	Circle 2	full	semi	partial		N W S E
	Stone Size	S	M	L		T F S A
	Distance stones	Together	<1 m	>1 m		
	Circle 3	full	semi	partial		N W S E
	Stone Size	S	M	L		T F S A
	Distance stones	Together	<1 m	>1 m		

Mound Type	
Circumbscribed leveled elevation	Small Pile of Rocks
Elevated Foundation	Stone Wheel
Pile of Rocks	Other

Sketch Map

/\ North

Comments

Figure 13: Mound recording form.

of surface materials, morphological characteristics of each mound including measurements, as well as general topographic attributes, among others. However, after finishing mound recording around Aguas Buenas, Alejandro Arteaga suggested redesigning the form with a twofold argument. First, and as mentioned above, the research questions guiding mound recording practices at Aguas Buenas were very specific and site oriented, while the inquiries driving the surface survey of the whole research area were broader. Second, variability in mound morphologies, composition, construction techniques, site configurations, and relation to landscape also required recording a wider spectrum of attributes. In particular, variables necessary for a settlement pattern study were added (Arteaga 2017). As a result, a new form was developed collaboratively with the participation of all team members, using the knowledge obtained during the pedestrian survey. However, the majority of the criteria from the original form were maintained in order to design a database that could include the mounds already recorded by the project. The form went through various changes before reaching its final format (**figure 13**), and the major modifications are outlined in Appendix 1.

The extension of the research area beyond the first 12 sq km belonging to Quadrant 1 resulted in higher variability in architectural remains related to mound design, construction materials and techniques. This variability required increased flexibility in recording methods to allow for the inclusion of additional variables in order to exhaustively secure the documentation of all observable surface variation, while also facilitating quantification in the processing and analyzing of data. Even though the multiplicity of variables was challenging for

processing and analyzing the mound database, it was necessary for achieving the goal of systematic documentation. Instead of forcing the variables to match pre-designed forms, the form itself consisted of a methodological exercise in which all team members, from Bachelor, Masters, and PhD students, to local workers, participated through collective observations and discussions. As such, these protocols, in addition to the results of the survey, can serve as a proxy for future mapping endeavors in central Nicaragua, as well as other regions of the country.

For processing and analyzing the data recovered through systematic mapping, Leontien Talboom (currently a PhD student at University College London) designed a Microsoft Access database following the variables of the paper form used in the field. Sketch maps were digitized using *Adobe Illustrator*. Also, Alejandro Arteaga created a georeferenced database using ArcMap 10.2 by ESRI in order to generate maps according to the different attributes of each mound.

4.1.3 STRATIGRAPHIC EXCAVATIONS

The selection of the different loci for stratigraphic test pits implied strategic sampling at two different levels. First, the choice of which sites to excavate; and second, consistency in the diversity of specific areas within the sites to sample. The combination of these two sampling levels was designed to match the objectives of this study. As the research progressed, sampling techniques were further refined, so the development of strategies regarding the selection of excavation loci can be divided in three different moments:

- ***2015A Excavations***: these test pits were conducted during the second field work season—summer of 2015—and were all located in Quadrant 1. Consequently, the hierarchized variable was spatial, aimed at recovering a representative sample of Aguas Buenas materials, as well as some of the sites surrounding it.
- ***2015B-2016A Excavations***: these excavation units were dug between the autumn of 2015 and the winter of 2016; their selection was based on relative chronological criteria according to surface materials—both ceramics and architectural features.
- ***2016B Excavations***: these excavations, aimed at widening the data universe both synchronically and diachronically, took place in the summer of 2016. Since the main objective consisted of securing the acquisition of a representative sample for the history of ceramic manufacturing practices within the valley of Juigalpa, a spatiotemporal criterion was applied for sampling locations.

2015A Excavations

Understanding both geological and cultural stratigraphy was extremely important for a chronologically driven study, so the main goal of the first excavations within this research program consisted of the realization of stratigraphic test pits in diverse locations within and beyond Aguas Buenas, in order to establish and compare the different stratigraphic profiles. Consequently, the first locations for excavation were selected after a detailed study of the distribution of the surface materials, recorded during the surface survey season undertaken in the winter of 2015. The results of the surface survey were examined taking into account the general and specific aims of this research, so eight different excavation loci were selected for the fieldwork season of the summer of 2015 (**figure 14**). Sites representing various combinations of surface materials were chosen:

- A site with mounds, ceramics, petroglyphs, ground stone, and chipped stone (Aguas Buenas, UTM E 6 78 841 m – N 13 43 885 m).
- A site with mounds, ceramics, petroglyphs, and chipped stone (La Zarcita, UTM E 6 76 510 m – N 13 43 365 m).
- A site featuring mounds, ceramics, petroglyphs, and ground stone (Lázaro Villegas, UTM E 6 78 655m – N 13 43 364).
- A site yielding ceramics, chipped stone, and ground stone (Sebastián Ríos, UTM E 6 79 069 m – N 13 43 084 m).
- A site containing mounds, ceramics, chipped stone, and a basalt column (La Aventura, UTM E 6 7 6019 m – N 13 41 073 m).
- A site with only mounds visible on the surface (Alberto Obando, UTM E 6 78 037 m – N 13 43 937 m).
- A site featuring only chipped stone and ground stone on the surface (Jerry Hernández, UTM E 6 77 405 m – N 13 42 608 m).
- A site with only chipped stone surface materials (La Vaina, UTM E 6 76 807 m – N 13 41 988 m).

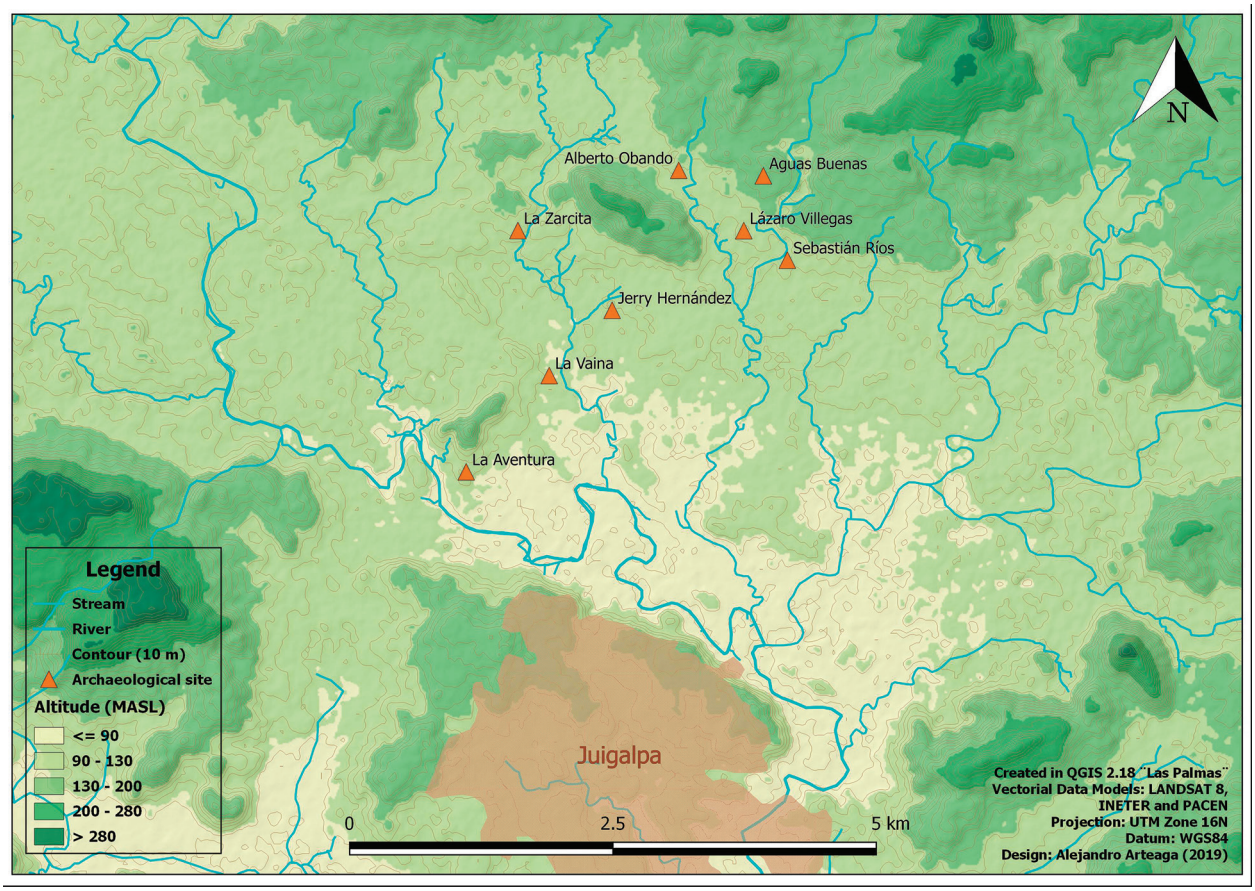


Figure 14: 2015A Excavations (credit: Alejandro Arteaga).

During this stage of the research, no typology was available for classifying the sites, and no spatial analysis of the systematic survey data was yet ready.[56] However, a systematic sampling strategy was applied, so the combination of presence and absence of various surface materials was established as a preliminary hierarchy of attributes for choosing which sites should be sampled. Material culture at the two un-mounded sites (La Vaina and Jerry Hernández) excavated during the 2015A season was extremely scarce. In contrast, a higher frequency of finds was retrieved from sites featuring architecture. For this reason, the decision to favor mounded sites was made, with the exception of Sebastián Ríos Histórico (see below).

56 Results are now available in Arteaga (2017) and Donner *et al.* (2018).

2015B-2016A Excavations

The main goal of these excavations was to stratigraphically sample two sites that evinced possible late—colonial and historical—surface materials. In order to construct a chronology extending through to the present, sampling these sites was a priority. Two different sites, which yielded diverse material culture remains on the surface, were sampled accordingly (**figure 15**):

- *Sebastián Ríos Histórico*. This site was selected because, even though it did not feature architectural remains, surface ceramics yielded materials preliminary dated between the sixteenth and the twentieth century (**figure 16**), mixed with pre-Hispanic pottery and chipped stone fragments. Colonial ceramics were exclusively identified on the San Gabino hill, so the inclusion of

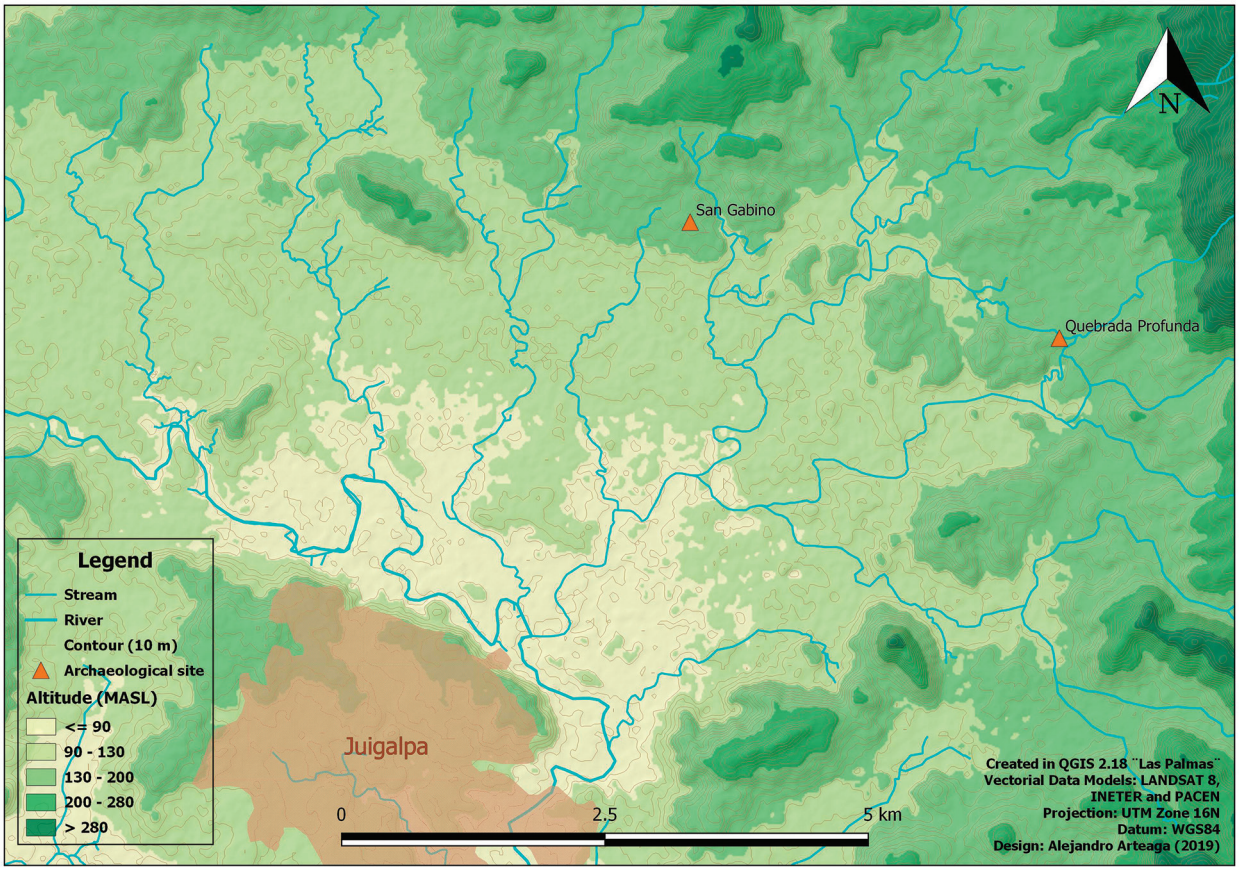


Figure 15: 2015B-2016A Excavations (credit: Alejandro Arteaga).

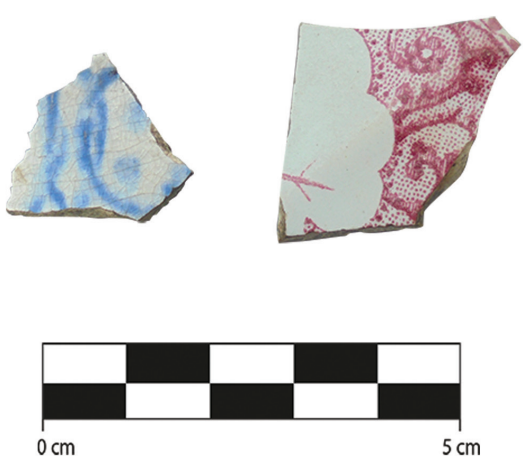


Figure 16: Post-contact ceramic sherds identified at Sebastián Ríos Histórico.

this context ensured the characterization of ceramic manufacturing operational sequences after the European invasion. The study of the technological changes experienced by pottery production is of extreme relevance to understand strategies of resilience and embodied resistance.

- *Quebrada Profunda*. This site was selected mainly due to spatial and architectural features. To begin with, it includes three different mounded areas: Southern, Central, and Northern. Within the Central area, a quadrangular structure was recorded by Arteaga (2017), which was preliminary interpreted as historical. Excavations were planned for each area within the site to ensure a comparison of the different sections, as well as to the materials recovered at Sebastián Ríos Histórico.

Cluster	Site codes	UTM E	UTM N	No of mound clusters	No of mound clusters excavated	Names of the clusters excavated
A	RDOI, RDOII, RDOIII,OP, WMI, WMII, WMIV, WMV, CAO, EV	6 81 860 m 6 82 811 m	13 44 000 m 13 43 230 m	3	3	Rosa Dolores Oporta (RDO) Oporta (OP) Wilder Marín (WM)
B	AM, AMII, WG	6 81 000 m 6 81 160 m	13 42 580 m 13 42 280 m	2	1	Alcides Montiel (AM)
C	SRRI, SRRII, CV, GSI, GSII, EM, EMI, Sabana Grande, JFA, OSI, OSII, OSIV, OSH, RLI, NC	6 79 640 m	13 41 450 m	4	2	Sabana Grande (LD)
		6 81 660 m	13 40 000 m			Piedras Grandes (JOR)
D	RAI	6 77 330 m 6 77 550 m	13 40 555 m 13 40 460 m	1	1	Roberto Amador (RAI)
E	UBI, UBII, UBIII, UBIV	6 72 770 m 6 73 400 m	13 44 170 m 13 43 740 m	1	1	Barillas (UBI)
F	Los Andes	6 89 300 m 6 90 350 m	13 39 690 m 13 37 140 m	4	None	N/A

Table 3: Sites tested during the 2016B excavations.

2016B Excavations

For this last stage of the excavations, the complete map of mounded and un-mounded sites within the research area was complete, except for Quadrants 6 and 7, which were left aside because they correspond to the community of El Cóbano, which is outside of the valley, and materials excavated at La Pachona by Vlaskamp were already available for comparison. According to the map showing the distribution of mounded sites within this subarea,[57] excavations were planned in six different areas (A, B, C, D, E, and F). The concept of mound cluster was applied for defining sites and excavation areas following Arteaga (2017). Even though the use of the term site is subject to debate (Willey & Phillips 1958; Hurst Thomas 1975; Foley 1981; Binford 1982; Dunnell & Dancey 1983; Dunnell 1992; Ingold 1993),[58] it became a useful category to refer to mounds grouped within a 75 m range, as characterized by the spatial analysis conducted by Arteaga (2017). The different locations for excavation are summarized in **table 3**.

Cluster A is formed by three groups of mounds (RDO, WM, and OP) plus some isolated mounds, all situated on the northeasternmost section of the research area, along the Copelito-Carca stream. While RDO and WM are located east of a meander of this body of water, OP is placed west of it. Excavations were conducted at the three different sites to establish their chronology as well as to understand spatial configurations and possible practices associated to the sites. Architectural remains combined low platform mounds with larger elevated foundations, geometric arrangements—WM and RDO—as well as large mounds surrounding flat terrains, at least for RDO and OP. Surface materials were visible, especially around larger mounds.

Cluster B comprises two sites or mound groups (AM and WG) that are situated on the southeasternmost portion of a super cluster that includes Aguas Buenas

57 See Chapter 5.2, page 90, **figure 26**.

58 See Herrera Malatesta (2018, 24-30) for a detailed examination.

and surrounding sites forming a block of mounded sites with a northwest to southeast orientation—following the geomorphology possibly associated to a fault—that spans for almost 5 km from La Zarcita (excavated in the summer of 2015) to AM and WG. These two sites feature a certain level of geometric architectural arrangement, combining low platforms with larger structures. At AM, the flat terrain surrounded by mounds does not include three larger mounds in the center—like in RDO or OP—instead, a single larger mound (ALMII12) is located next to a large low platform (ALMII13), which yielded the only visible surface materials. The rest of the site—as well as WG—featured no surface materials.

Cluster C is comprised of four groups of mounds (Arteaga 2017) located at the south of the research area in association to the meandering Carca stream. Monumental sculpture fragments were observed during the surface survey exclusively at two sites throughout the research area, both belonging to this supercluster: Sabana Grande and Piedras Grandes II. Excavations were planned for both groups (LD or Sabana Grande and Josefa Ocón Robleto or Piedras Grandes II), in order to gather comparable materials from mound groups that were different in terms of spatial arrangement, morphology, and ubiquity of surface materials. While Sabana Grande featured high densities of archaeological materials at the surface, Piedras Grandes II yielded low frequencies of surface ceramics. Also, previous work at the site (Magnus 1975b) and observations conducted in the field derived from the preliminary grouping of Sabana Grande with other clusters featuring high surface material densities in combination with diagnostic Pacific Nicaragua materials, such as Roberto Amador and La Pachona. The materials excavated by Magnus (1975b) were dated to the Potrero phase, according to Gorin's chronology (Gorin 1990). In contrast, Piedras Grandes II seemed to evidence lower impact practices. Therefore, excavations were planned for both sites with the working hypothesis of synchronicity, in order to compare such spatially close sites, which could have been inhabited by the same communities of potters.

In order to gather a representative dataset comparing similar and divergent contexts, cluster D, corresponding to the Roberto Amador site, was sampled for excavations. This site is located south of a meander of the Mayales river, less than a kilometer north of the town of Juigalpa. While mounds vary in morphology and size, surface materials are abundant, which is a tenet shared—as mentioned above—with only a few other sites within the research area. Accordingly, a stratigraphic test pit was realized at the site.

Cluster E is comprised of the mounds of Barillas, an archaeological site previously excavated by Magnus (1975b) and ascribed to the Cuapa phase according to Gorin's (1990) sequence. The site is situated by the Mayales river, and it was sampled for excavations due to its spatial arrangement, the quantity, types, and sizes of mounds, as well as its medium density of surface materials. Apart from that, Barillas is the only site that features a petroglyph outside of the geomorphological unit where Aguas Buenas is situated, evincing continuity in two-dimensional rock carving practices throughout the valley.

Excavations at Cluster F, at Cerro Los Andes, were programmed due to the differential mound morphologies (Geurds 2009), combined with the fact that Gorin (1990) used materials at the Gregorio Aguilar Barea Museum with a provenance from Los Andes for defining the Mayales I and II phases, the earliest in his chronology. Since these contexts lacked stratigraphic excavations and both phases were not dated through absolute techniques, a systematic survey immediately followed by stratigraphic excavations was planned. However, land owners only allowed the team to conduct the surface survey and did not grant permission for excavations. Therefore, archaeological materials and radiocarbon dates were not retrieved. However, a first map of the complete distribution of mounded sites on the plateau of the mountain was achieved, although this data is still being processed.

In summary, the 2016B excavations were concentrated in five different sections within the research area, covering both the Carca stream and the Mayales river bank, the areas with the highest concentrations of surface ceramics, the sites that are part of larger clusters as well as "isolated" mounded sites, and several spatial configurations combined with different mound morphologies. The next step was to select comparable contexts within the sites for sampling strategies.

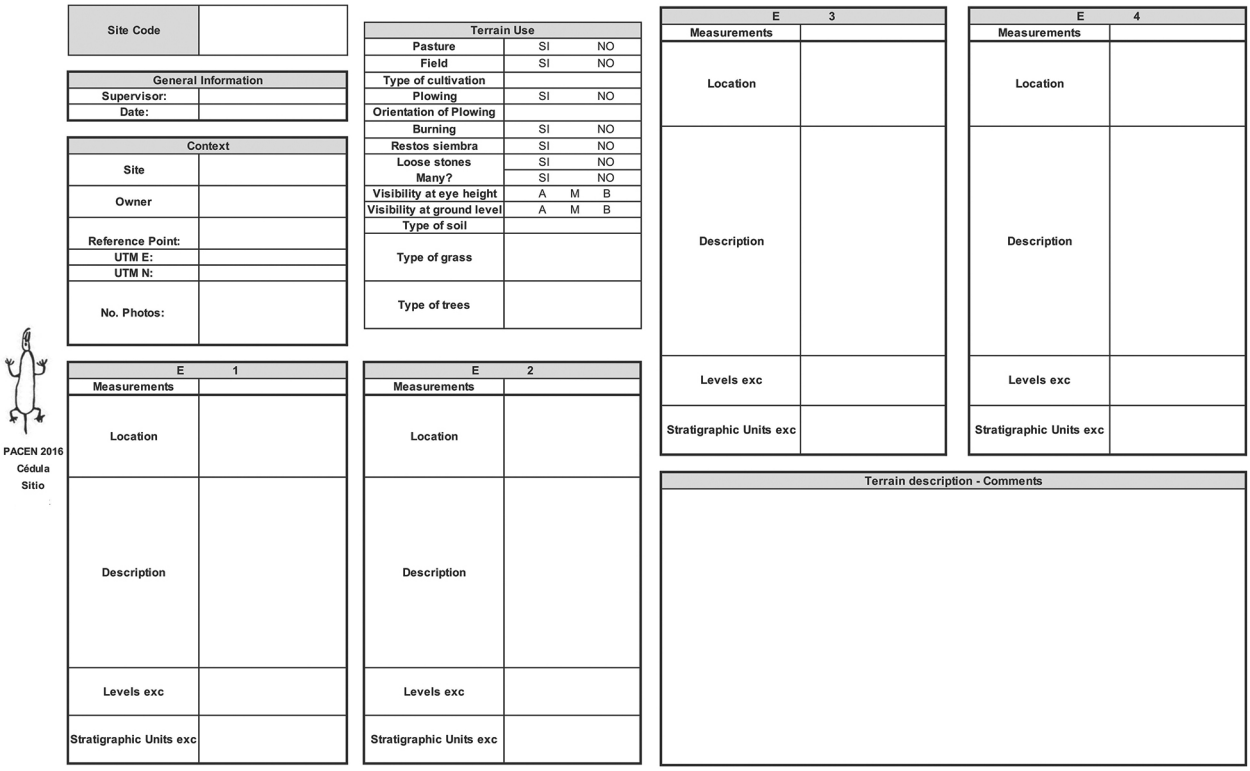
Methodology

Since the main goal of the stratigraphic excavations was situating mounded sites in specific time intervals through the study of their geologic and cultural stratigraphy, interventions within structures were not planned for the first seasons of excavations. Once

the architectural and spatial datasets were partially processed and analyzed, a limited number of mounds at specific sites were selected for sampling materials used as filling for construction purposes in order to draw comparisons with off-mound assemblages and also confirm or discard synchronicity between on- and off-mound materials.

Accordingly, several excavation strategies were combined in order to study the stratigraphic profiles of the different sites, as well as to ensure the comparability of the ceramic materials retrieved. Therefore, three different types of test pits were excavated, whose dimensions and shapes varied according to their location, objectives, and material densities at the surface, as well as geomorphological associations:

1. **2x2m stratigraphic test pits.** Three different criteria were applied to place these excavation units:
    a) On flat portions of terrain surrounded by mounds, always taking into account their location relative to the central or largest mounds. The goal of these pits was the evaluation of open flat spaces, which probably served as access to structures, general pedestrian circulation between mounds, and areas for gathering, as well as for daily, seasonal, and nonroutine practices. Excavations aimed at identifying floor levels, which are common in flat surfaces surrounded by architectural remains, to be stratigraphically used as temporal markers between materials retrieved below and on top of them.
    b) At the "*backyard"* of the largest mound. If the flat open areas described above are indeed places for the abovementioned practices, then it is important to excavate the opposing backside of the mounds as well to assess possible differences between the two contexts. The main goal of these excavations was to compare and contrast the materials found in the open flat areas with the ones retrieved "behind" the mounds. If the open areas were used for communal practices, it is feasible that more private habitual practices, including trash disposal, could have taken place behind the mounds. For example, as larger mounds require a high architectural investment, one could expect larger concentrations of materials around them. Of course, cleaning practices might disturb depositional processes, but comparative test pits would aid in understanding potential spatial differences in off-mound settings.
    c) In areas where surface materials are found in high or medium frequencies. For unmounded sites, such as Sebastián Ríos Histórico, for instance, excavation units were placed in sections with high densities of surface materials.
2. **3x1 m approximation trenches.** The main goals of these test pits consisted in the identification of floor levels immediately related to architectural remains and the foundations of structures, as well as the differentiation between off-mound and filling materials and the study of construction techniques. Also, these excavations aimed to test Arteaga's preliminary mound typology, which was based only on surface observations (Arteaga 2017). Apart from that, they allowed for the dating of different types of mounds to establish chronological relationships and consequently to propose, maybe at a future stage of PACEN's research, a chronology for mound building practices.
3. **1x1m stratigraphic test pits.** Small excavation units aimed at obtaining stratigraphic profiles were programmed in the following cases:
    a) Sites associated to intermittent streams that lacked architectural remains and surface ceramics, such as Jerry Hernández and La Vaina, and that also featured clayish soils resulting from alluvial processes. In these cases, the test pits aimed to secure a stratigraphic column to determine whether earlier traces of



Site Code	

General Information	
Supervisor:	
Date:	

Context	
Site	
Owner	
Reference Point:	
UTM E:	
UTM N:	
No. Photos:	

Terrain Use		
Pasture	SI	NO
Field	SI	NO
Type of cultivation		
Plowing	SI	NO
Orientation of Plowing		
Burning	SI	NO
Restos siembra	SI	NO
Loose stones	SI	NO
Many?	SI	NO
Visibility at eye height	A M	B
Visibility at ground level	A M	B
Type of soil		
Type of grass		
Type of trees		

E 1	
Measurements	
Location	
Description	
Levels exc	
Stratigraphic Units exc	

E 2	
Measurements	
Location	
Description	
Levels exc	
Stratigraphic Units exc	

E 3	
Measurements	
Location	
Description	
Levels exc	
Stratigraphic Units exc	

E 4	
Measurements	
Location	
Description	
Levels exc	
Stratigraphic Units exc	

Terrain description - Comments

Figure 17: Definitive site form for excavations.

human presence in the area might have been buried by depositional processes.

b) Sites that did feature mounds but are located on elevated portions of alluvial terraces in association to clayish soils—also the product of alluvial processes. These excavation units aimed to study the geologic stratigraphy of clayish soils in combination with shifts in human-environmental interactions related to possible flooding events associated to the Mayales river.

Once the excavation unit was situated within the spatial arrangement of the site, the excavation procedure started with the layout of the units. For this, orientation to the magnetic north—using a compass and the Pythagorean system—was always followed, except for the approximation trenches, which were oriented according to the mound(s) spatial logic. Data recording was undertaken in three different forms: one per site (**Appendix 2**), which included location, general description of the site, and excavation units; one for each arbitrary 10 cm level (**Appendix 3**); and one for each stratigraphic unit or interphase (**Appendix 4**). However, after the 2015A excavation season, it was necessary to reduce the number of forms, so the arbitrary level form was eliminated, and the site (**figure 17**) and stratigraphic unit (**figure 18**) forms were redesigned to their final format. The new forms, which were based on the experience of the first excavations, were specifically tailored to thoroughly describe stratigraphic units combining layer and level data in order to interpret the excavation dataset according to Harris' premises (Harris 1989; 1993). Therefore, the new stratigraphic unit form was organized in different sections, including general data, depth, description, presence of different types of materials (and their bag numbers), information regarding the documentation team, interpretations, and sketch drawings. In the case of identifying interphases, a different form was filled out and stored together with its corresponding stratigraphic unit.

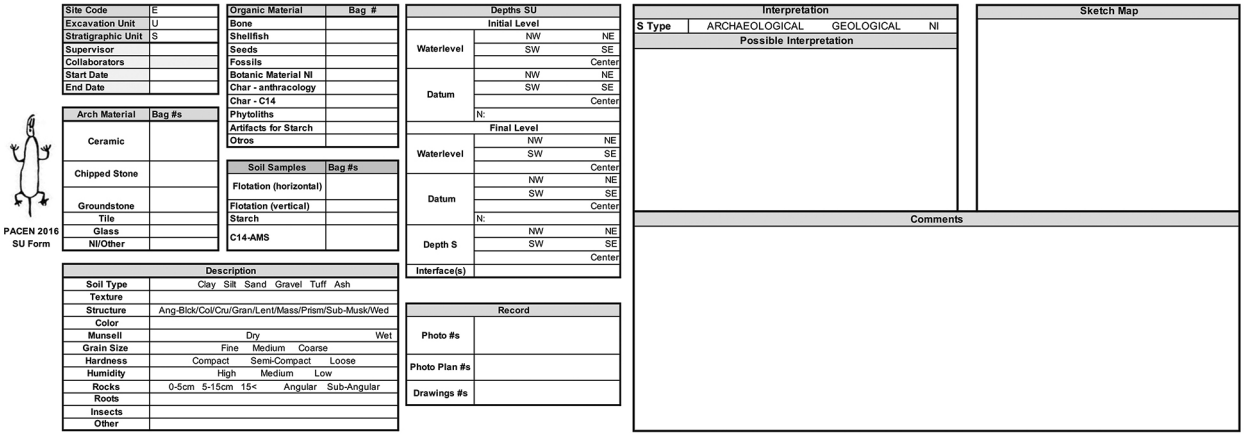


Figure 18: Definitive stratigraphic unit form for excavations.

The new sections included in the final version of the stratigraphic unit form are the following:

- Additional details regarding measurements below the *datum*. During the 2015A excavations, several units were located on slopes, so it became necessary to record different hypsometries within the test pits in detail.
- Systematization of the different types of soil according to local nomenclature (clay, silt, sand, gravel, tuff, ash, etc.), granulometry (fine, medium, coarse), hardness (compact, semi-compact, loose), humidity (low, medium, high), and size of excavated rocks.
- A special section was created in order to include the list of bags corresponding to soil samples related to macrobotanical analysis (flotation) and microbotanical analysis (starches and phytoliths). Apart from that, specific forms were designed for the quantification of all bags containing soil samples. Additionally, a section was added to record samples for organic sediment dating through AMS.
- A segment of the form was included to document the picture numbers for orthophotos, since this georeferenced recording procedure became a systematic part of the excavation methodology from the 2015B season on.
- The form included a new section on interpretations of stratigraphic units, which allowed excavators to hypothesize whether they are geological or natural, as well as providing other insights.

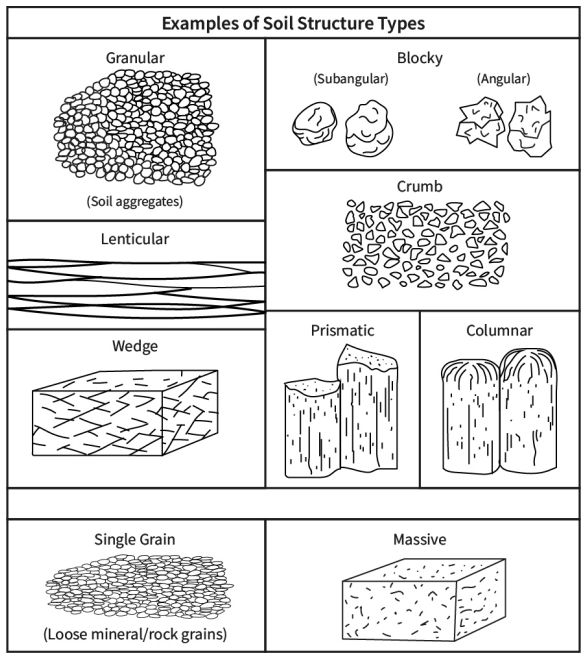


Figure 19: Soil structure macroscopic description chart (redrawn from Natural Resources Conservation Service 2020).

During the 2016B excavation season, a section for describing the structure of the stratigraphic units was included in the form, following simple macroscopic criteria visible on the units' profiles as well as during the excavation process (**figure 19**). This classification later aided—together with other soil characteristics, such as color, depth, and grain size, among others—

in the identification of soil horizons. Soil horizons were defined in Chapter 5 according to the guidelines established by the Food and Agriculture Organization of the United Nations (Jahn *et al.* 2006).

Apart from these forms, documentation included a photographic record (always including a white board with contextual information as well as a north arrow and a scale) of the beginning of each excavation unit; of each stratigraphic unit (plan), feature, and find; of the conclusion of the excavations; and of the closure (backfilling) of the pit. These pictures were complemented by the orthophotographic record mentioned above, which followed the same criteria, including all stratigraphic units, different moments within the excavation process, and select features and finds. A photogrammetric recording of the excavation units was also conducted during the 2016B excavations. Plan drawings for each arbitrary metric level, as well as of all finds and features, were carried out using a 1:10 scale. In the case of an absence of finds, rocks, or other elements, layers were sketched and described. All profiles of the excavation units were photographed and drawn at either 1:10 or 1:20 scale. All data recorded with the Total Station was also documented in a paper form especially designed for that purpose to avoid data loss.

Excavation techniques combined two different strategies: arbitrary 10 cm levels and stratigraphic units. If a change in layer was detected, a different stratigraphic unit was started, regardless of the metric level. However, materials from the same stratigraphic unit belonging to a different metric level were bagged separately. Consequently, strict stratigraphic control was ensured during all excavations. Additionally, all excavated sediment was sieved separately by stratigraphic unit, using a 10.0 mm sieve, and features as well as all contexts that yielded finds and zooarchaeological remains were sieved with a 5.0 or 3.0 cm sieve. All archaeological materials were stored in plastic bags and labeled with the name of the project, the site, the excavation unit, stratigraphic unit, arbitrary level, type of material contained in the bag, person responsible for the documentation, team members, date, and bag number.

To facilitate the recording process, all levels were referred to with Arabic numbers, while stratigraphic units (both geological and archaeological) were named using Roman numerals. Also, stratigraphic unit nomenclature was homogenized by site, except for Aguas Buenas, which is the largest mounded site—both in the number of structures as well as in the surface area that it covers—so a higher stratigraphic variability was expected. Therefore, if an excavation unit did not feature one stratigraphic unit present in other pits, the enumeration of the layers would still follow the absent layer. For example, in test pit 1 at La Aventura (ELAU1), layer IV was excavated, while test pit 2 (ELAU2) lacked it. Therefore, at ELAU2, the layer immediately below stratigraphic unit III was named V, with the aim to avoid repeated layer numbers with different stratigraphic characteristics at a single site.

At all sites, sediment samples for flotation as well as for microbotanical analysis were retrieved. Also, when large ceramic fragments (>5 cm), or chipped stone and ground stone artifacts (complete or semi-complete) were identified, photographs and drawings were made, and their 3D location within the pit was recorded using the Total Station. These finds were retrieved using surgical gloves to avoid contamination, and they were wrapped in aluminum foil and stored in the shade to avoid overheating, humidity, and fungal growth. These samples were taken for later microbotanical analysis. Charcoal fragments with potential use for radiocarbon dating were stored in double plastic bags, wrapped in aluminum foil, and labeled with all contextual data. Other measures to avoid contamination were taken during the excavation process and included the prohibition of eating or smoking near the pits, as well as the obligation to wash hands and shake off food crumbs from clothes after the lunch break.

Documentation with Total Station included the four corners of each unit at surface level, as well as systematic recording of the beginning and end of each layer at 20 cm intervals along the profile walls of the pits. Also, finds, features, and the datum were recorded. If the excavation unit was an approximation trench, complete Total Station documentation of the mound was conducted before, during, and after the excavation. This way, all necessary data for creating 3D models of the excavation units, and therefore of the stratigraphic columns, as well as intra- and inter-stratigraphic relationships, was recovered.

For closing the units, a thick plastic layer was placed on top of the last excavated level, then modern coins were placed, and then a 5 cm layer of sand was laid on top. Finally, the pit was covered using the excavated sediment. In order to avoid sinking of the sediments used for filling and its consequent deterioration due to humidity, sediment was tamped down every 40

cm. For these same reasons, the covering sediment layer was 5 to 10 cm above ground level.

Once materials were taken to the fieldwork lab, a form with the list of bags and materials was filled in by each unit supervisor, which included contextual and content data. All materials were washed using water and hands, only applying toothbrushes on the edges of ceramic sherds. After cleaning, they were dried in a shaded area on top of folded cardboard boxes, bagged in clean plastic bags, and stored in plastic boxes separated by site and excavation unit. All boxes were labeled and inventoried.

Apart from cleaning and storing archaeological materials, lab work during excavation seasons included the digitization of all forms filled out in the field, upload and organization of the photographic archive, digital redrawing of paper drawings in *Adobe Illustrator*, and the digitization of fieldwork diaries.

5 Spatiotemporal dataset

This chapter presents the spatiotemporal distribution of the data recovered during survey, mapping, and excavation, which will be divided in three different sections. To begin with, the results of the systematic full coverage high intensity surface survey and mound recording will be briefly summarized. The surface distribution of all of the archaeological remains encountered in the area will be addressed, including man-made mounds, ceramics, chipped stone, ground stone, petroglyphs, and sculpture fragments. A deeper discussion of surface finds can be found in Donner *et al.* 2018, and a full characterization of the settlement patterns of the research area, as well as thorough site descriptions, can be reviewed in Alejandro Arteaga's Master's thesis (Arteaga 2017). Even though 52 sq km were covered by the survey, only the results from a 42 sq km subarea will be discussed, because results from the survey extensions to the south (around La Pachona) and to the southeast (at Cerro Los Andes) are still pending analysis.

Second, the specific contexts excavated to retrieve the ceramic assemblage analyzed in this manuscript will be described. As part of the fieldwork conducted for this manuscript, 52 units were excavated in 18 different sites. However, and as will be outlined in Chapter 6, laboratory methods necessitate different sampling strategies. Therefore, only the seven excavated sites and 12 stratigraphic excavations which were sampled for full ceramic laboratory analysis will be thoroughly characterized. For these case studies, a site description will be included, as well as a general stratigraphic overview and a summary of the distribution of materials within the identified stratigraphic units. For the remaining eleven excavated sites and for the excavation units not included in the full analytical procedure, a summary of the results will be provided since the morphometric characteristics of the ceramics retrieved in those excavations are included in the discussion on Chapter 8.

Last, the radiocarbon dates obtained by Accelerator Mass Spectrometry (AMS) will be presented. In total, 28 samples were processed, including charcoal, charred seeds, charred residues adhered to pot sherds, zooarchaeological remains, and organic sediment. While 17 samples were analyzed by Beta Analytic (USA), one was processed by Poznań Radiocarbon Laboratory (Poland), and the remaining ten were run by the Keck-Carbon Cycle AMS facility at University of California, Irvine (USA).

5.1 SURFACE SURVEY RESULTS

The detailed pedestrian survey was an opportunity not only to record the distribution of archaeological evidence throughout the research area, but also to become familiar with the landscape, including its vegetation, fauna, rural settlements, topography, and especially its people. The observable history of the valley of Juigalpa spans from its geological origins, goes through pre-Hispanic and colonial traces, and includes the remnants of the Sandinista revolution and civil war times, as well as the devastating effects of modern activities and their unregulated deforestation practices, all of which have had dramatic effects on the lives of humans, animals, insects, plants, soils, and water sources.

The range of pre-Hispanic evidence found on the surface included man-made mounds, ceramics, chipped stone, ground stone, mortars or polishers,[59] petroglyphs, stone sculpture, and basalt columns. The differential distribution and spatiotemporal interrelationships of these finds throughout the

59 Mortars or polishers refer to circular or quadrangular features carved on bedrock outcrops, which could have been used as mortars for grinding products (both edible and not edible) and also as polishers.

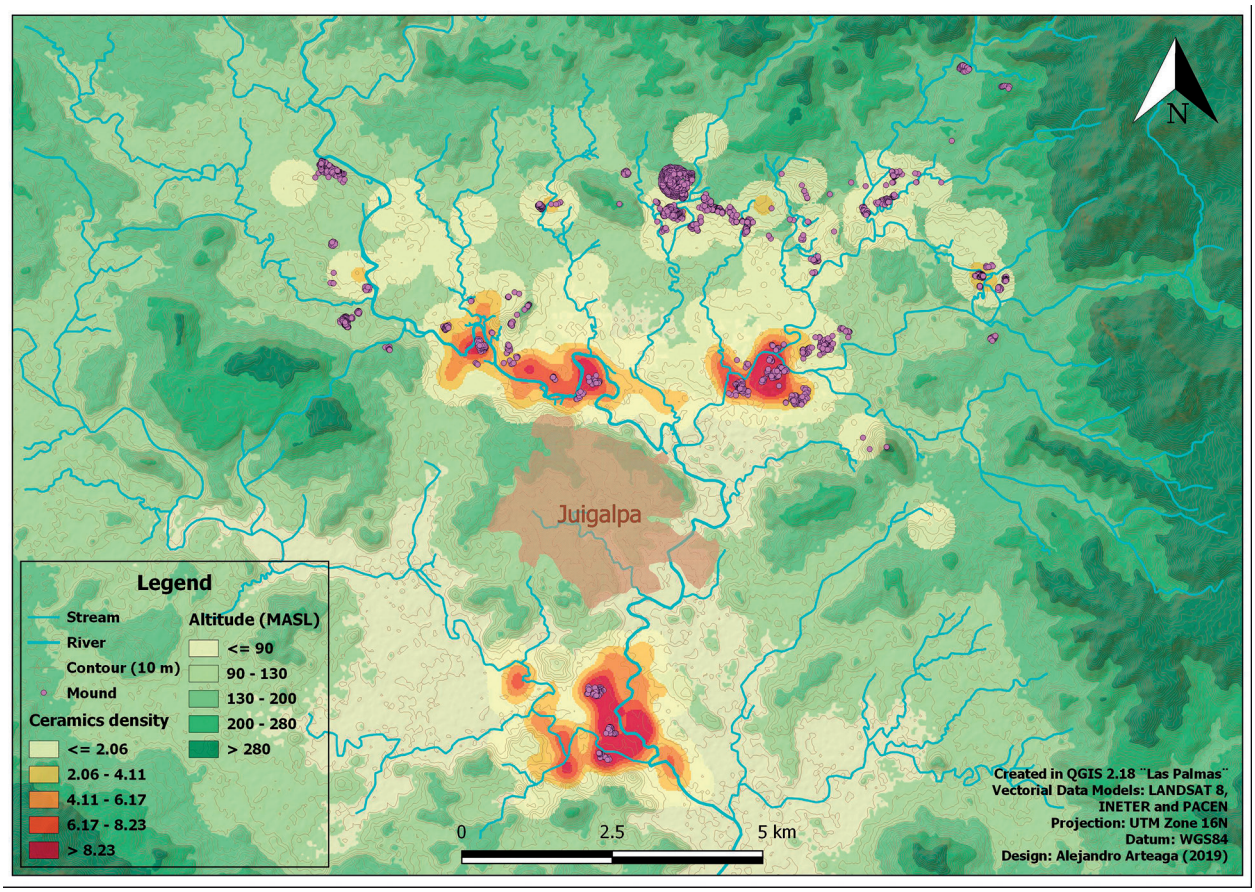


Figure 20: Distribution of surface ceramics throughout the research area (credit: Alejandro Arteaga).

valley is of relevance for understanding the history of dwelling practices, from ancient times through the present.

Surface ceramics featured varied visible attributes but are generally characterized as small fragments of usually between 3 and 4 cm, with pastes of brown to red colors, mostly undecorated. When decorations were present, they were mostly comprised of incisions and/or monochrome brown or red slips, as well as white slips in significantly lower quantities. Very occasionally, painted polychrome fragments were also identified on the surface. In one case, Sebastián Ríos Histórico, colonial sherds were identified during the survey.

Surface ceramics were found distributed throughout the research area in 250 locations, which were mainly associated to river and stream banks, as well as sites with architecture (**figure 20**). However, ceramics were absent on the floodplain located south of Aguas Buenas, in the area covered by soils that are locally referred to as *barrial* (vertisols). The highest concentrations were located south of the valley, within the section where both the Mayales and the Carca rivers show a large number of meanders and intersections with seasonal and permanent streams. These areas with high concentrations of surface ceramics are also associated to the Sabana Grande site cluster and the Roberto Amador-Inés Rocha-La Aventura-Güegüestepe site cluster.

According to the results yielded by a systematic clay survey, these two clusters also coincide with the most extensive clay outcrops within the research area (Casale 2017; Casale *et al.* 2020) and could have been used by different communities over several centuries, even before the construction of the mounded sites (Donner *et al.* 2017). Also, the area along the Mayales river that presented large amounts of surface ceramics is home to contemporary potters,

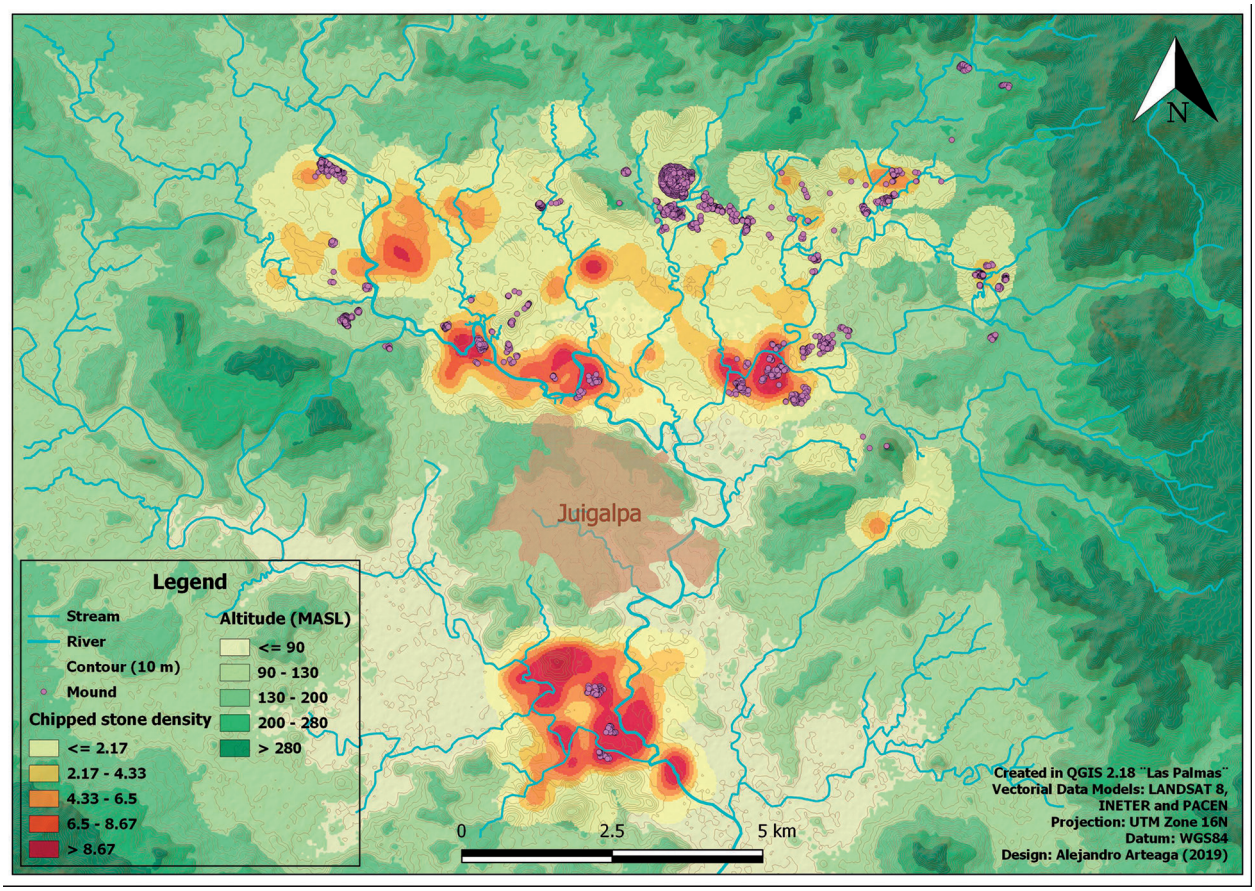


Figure 21: Distribution of surface chipped stone throughout the research area (credit: Alejandro Arteaga).

like the Güegüestepe community, which was still active by 2015 but almost completely abandoned in 2016 due to migrations connected with low demands of ceramic vessels at regional markets and the persistence of drought. Other potters were identified in this area, particularly along the road to the town of Cuapa, made visible thanks to their kilns located in front and behind their houses right by the road. In spite of these contemporary cases, recording of surface finds was carefully conducted to differentiate between contemporary and ancient pottery. In doing so, the aim of reconstructing the history of pottery-making practices throughout the research area was met.

In general, surface ceramic finds throughout the research area are low when compared to other regions of Nicaragua and southern Central America. As a result, the values in the mound recording form—as outlined in Chapter 4—established that a 'high density' was represented by 40 or more sherds per find spot. In some sites, especially Aguas Buenas and its surroundings, surface ceramics are hardly visible at all. Only in four specific cases, namely Guarida del Coyote, Roberto Amador, the Sabana Grande cluster, and La Pachona, this situation was completely different, with very high quantities of surface ceramics and materials in general. Another site outside of the research area, Santa Rita, also features such higher densities, with the possibility of counting 50 rims after walking a few steps across the site.

Chipped stone was registered in 446 loci, covering the research area with a clear pattern of higher densities along the rivers, streams, mounded sites, and on the central floodplain, where ceramics are all but absent (**figure 21**). The concentrations of chipped

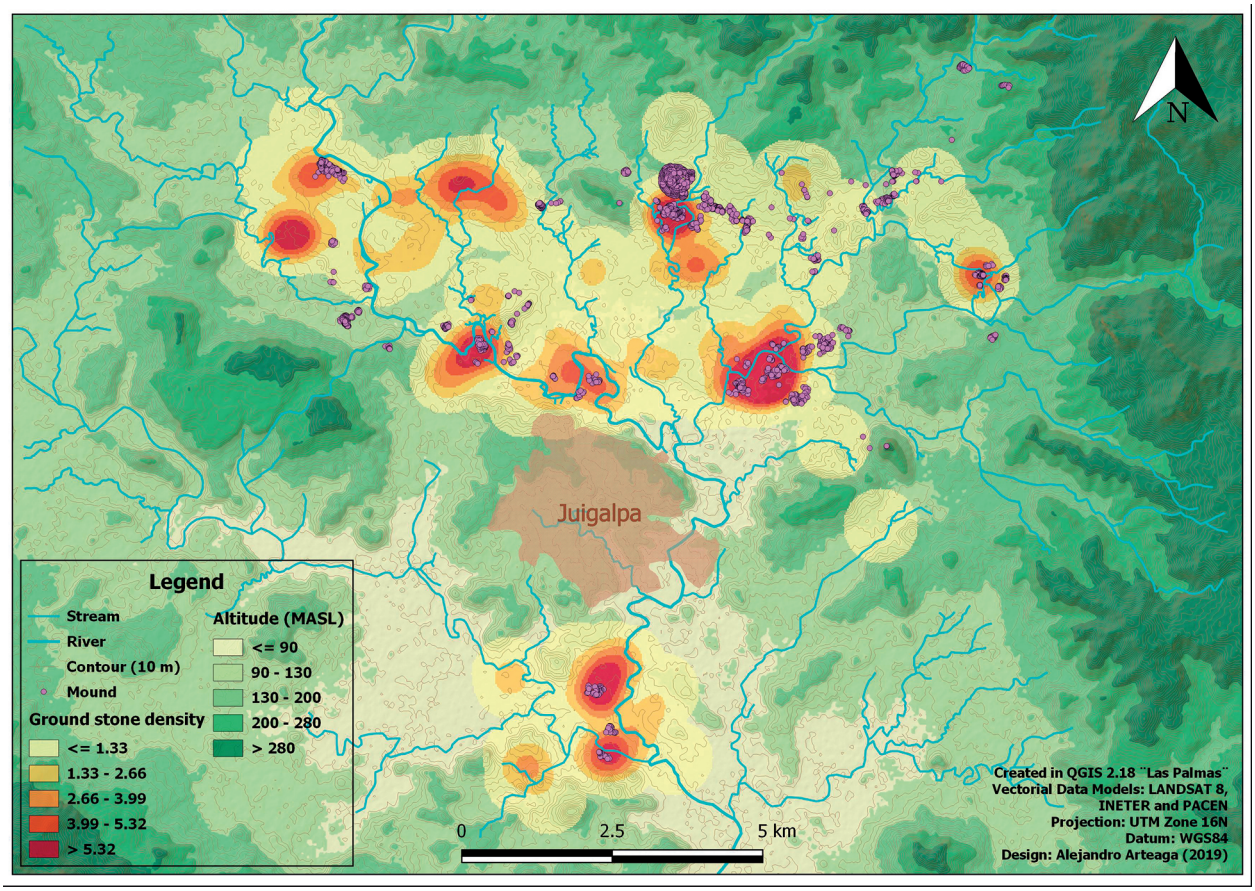


Figure 22: Distribution of surface ground stone throughout the research area (credit: Alejandro Arteaga).

stone fragments are more distributed throughout the research area when compared with surface ceramics. Also, chipped stone was the most abundant type of find recorded during the pedestrian survey, and four out of the six concentration areas with highest densities coincide with the highest densities of ceramics: Guarida del Coyote, Roberto Amador, the Sabana Grande cluster, and La Pachona.

Finds were mostly characterized by an industry of small flakes and other cutting tools such as scrapers and knives, with occasional observation of complete artifacts like arrow points or bifaces. Raw materials consisted mainly of different types of chert, and possible locations for procurement could be the rivers and streams. However, a hill situated to the northeast of La Pachona presented some evidence for raw material procurement practices and could partially explain the much higher densities of lithic artifacts on the surface of that site. This site had been previously recorded by Rigat (1992) and named I44, being characterized as both a quarry and workshop (Gorin 1990, 160). Even though the materials—identified as jasper—did not seem workable at first sight, experimental burning conducted by J.C. Moreno de Sousa and S. Castillo Jiménez showed that thermal pretreatment enhances the quality of the raw materials, making flaking possible and producing usable sharp end products. Very few obsidian fragments were observed on the surface within the survey area, with the caveat that obsidian was only separately recorded from chipped stone halfway through the survey. Therefore, localities with surface obsidian could not be quantified, but its occurrence during excavations will be addressed below.

The materials classified as ground stone mostly included grinding tools, such as fragmented *metates*, *manos*, *morteros* and *manos de mortero*. Also, a

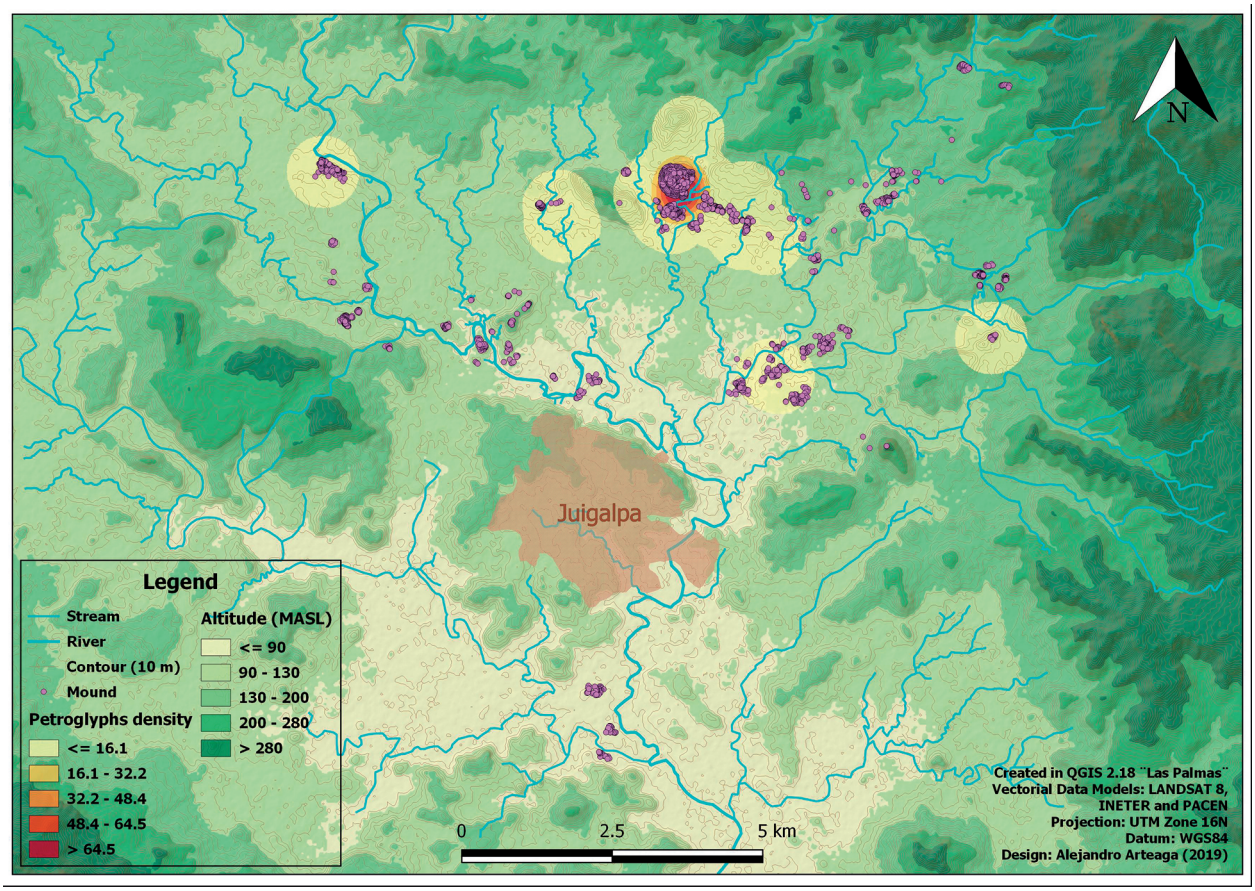


Figure 23: Distribution of surface petroglyphs throughout the research area (credit: Alejandro Arteaga).

few complete axes were recorded. Raw materials for these kinds of artifacts were likely procured from local streams and rivers, as these provide a wide variety of boulders, volcanic in origin, with highly heterogeneous rock matrices and suitable for chipping. Additional materials could have been procured from the Amerrisque mountains or nearby peaks, such as Cerro de la Cruz.

Ground stone was recorded in 158 different locations throughout the research area, associated to streams, rivers, and mounded sites (**figure 22**). The floodplain tended to feature small concentrations and the distribution pattern, in comparison with the other two industries discussed, shows clustering in a wider area. However, Guarida del Coyote, the Sabana Grande cluster, and La Pachona also feature high surface densities, as was the case with ceramics and chipped stone. Barillas and Lázaro Villegas, which have low densities of ceramics and moderate quantities of chipped stone, in contrast show high quantities of ground stone. Some unmounded sectors to the northwest of the research area featured numerous ground stone fragments.

80 different panels with petroglyphs were recorded, which were carved into either bedrock outcrops or loose rock fragments (**figure 23**). Integration between rock carving and mound construction practices is evidenced at the surface by the 16 petroglyphs that were carved on outcrops also used as mound foundations.

Additionally, 45 natural stream pools were located in the area; and one site—Las Pocitas—stands out because it integrates a seasonal stream, stream pools, and 14 petroglyph panels, with no association to any other material culture. These petroglyphs and stream pools are all located on the

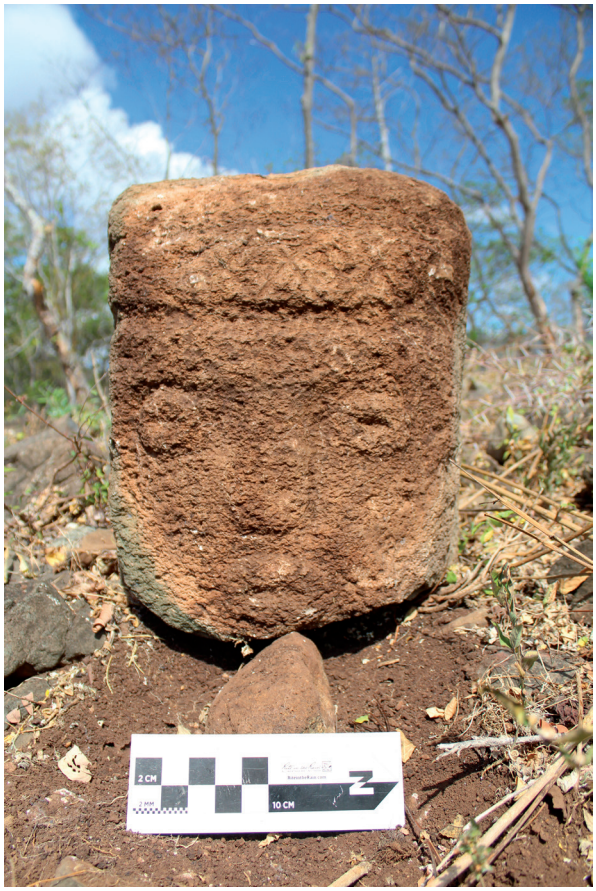


Figure 24: Fragment of stone sculpture located at the Piedras Grandes II site (credit: Alejandro Arteaga).

same geomorphological unit as Aguas Buenas—the piedmont north of the plain, where bedrock outcrops, streams, and pools occur naturally. Mortars were also encountered within this section of the research area, with one additional location that corresponds to Roberto Amador, which is an exception to this geomorphological pattern.

Moreover, five fragments of stone sculptures were found near four mounds (**figure 24**), in addition to a sphere carved from igneous rock (30 cm diameter) located on the plain, near a small stream and surface chipped stone finds (**figure 25**). Finally, 31 unworked basalt columns, possibly procured at Cerro de la Cruz located 2 km east of Juigalpa, were documented throughout the research area, and they seem to have been construction materials associated with mound building.

Figure 25: Igneous rock sphere.

5.2 MOUND RECORDING RESULTS

Mound recording took place only within 48 sq kilometers of the research area, in the entirety of quadrants 1, 2, 3, 4, 5, and 8 and in parts of quadrants 6 and 7. Quadrant 7 was not completed due to lack of time and the recognition that mound morphology was distinct from the rest of the research area. This variability entailed methodological and technical challenges that exceeded the time and budget available for this research. Therefore, data analysis focused on a smaller area of 42 sq km that shows shared mound building practices throughout a period of at least 1000 years.

In total, 1671 mounds were recorded in the research area; 1300 were documented between 2015 and 2016 (Arteaga 2017; Donner *et al.* 2018) and the remaining 371 correspond to Aguas Buenas (Geurds & Terpstra 2017; Auziņa 2018) (**figure 26**). An analysis of mound morphologies and spatial arrangements of Aguas Buenas can be consulted in Dita Auzina's Research Masters thesis (Auziņa 2018). Mound morphologies outside of Aguas Buenas are diverse. From the 1300 recorded, 81% were circular, 12%

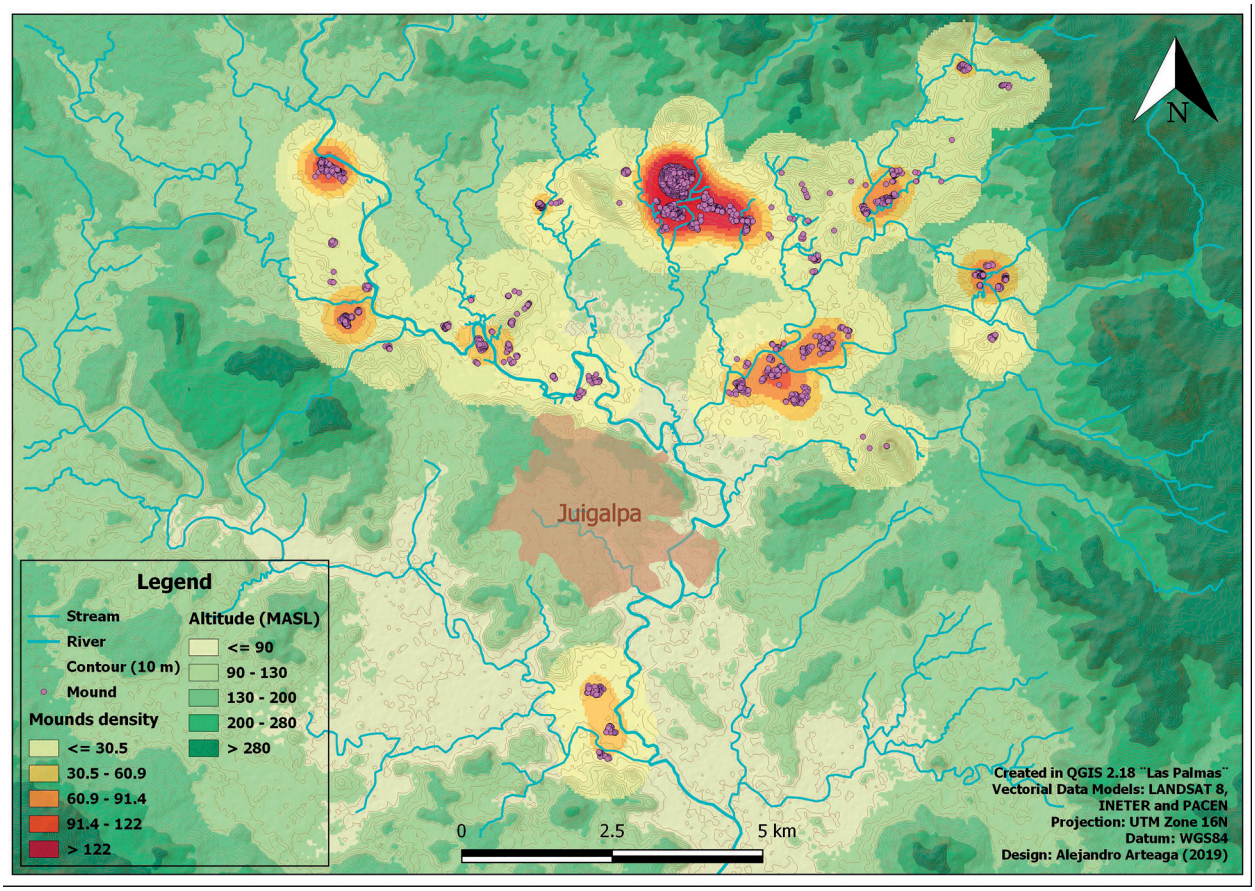


Figure 26: Distribution of man-made mounds throughout the research area (credit: Alejandro Arteaga).

were ovaloid varieties, and 3% were semi-circular or incomplete circles. The rest of the mounds, 4%, were represented by rectangular and irregular shapes, as well as stone alignments (Arteaga 2017; Donner *et al.* 2018). Overall, architectural remains average 6.5 m on their longest axis and 0.33 m in height. Construction materials consisted of bedrock fragments, river stones, and sediment, as well as chipped stone, ground stone, and ceramic fragments (Arteaga 2017; Donner *et al.* 2018).

Architectural remains were grouped in 47 different mound clusters, which were defined by creating 100 m cluster groups based on site design; mound distributions; the presence of large flat areas surrounded by mounds (*plazas*, backyards, communal localities for integrative practices); and geomorphological constraints, including rivers, streams, and elevations, among others.[60] The different mounded sites and clusters share certain patterns concerning their relationships with water sources, soil types, geomorphological units, and variability of materials found on their surfaces. First, sites are distributed throughout the slightly inclined slopes of bedrock formation north of the area, either associated to seasonal streams, such as Aguas Calientes and Aguas Buenas, or along the Mayales river and Carca stream, which have a year-round water flow. Mounded sites located on top of Cerro de la Cruz and the Aguas Calientes hills are exceptions to the previous pattern, as they are not situated immediately near water sources. Another exception are sites located on alluvial plains.

60 The term plaza is used here without implying a Mesoamerican bias related to specific schemes of social organization and distribution of power (Tsukamoto & Inomata 2014).

Second, more than 80% of the sites are associated to *tierra lanilla* (alluvial soil) surface soil, which is characterized by fragmented and weathered volcanic tuff that covers roughly 50-60% of the research area (van Dijk 2017). Sometimes, *tierra lanilla* occurs in combination with *tierra normal* (tropical brown alluvial soil) and/or *talpetate* (young volcanic ash). Sites that do not show this surface soil are usually located on hilltops, such as Güegüestepe, Cerro Aguas Calientes, and Cerro de la Cruz. Less common surface soils associated to mounded-sites are *tierra normal* and *granza*, which consist of tropical iron-rich alluvial soils with high fertility. In contrast, there is a total absence of mounded sites in correlation with *barro* (tropical alluvial soil), *arena* and *arenoso* (alluvial deposits which occur on riverbanks and along streams), as well as *barrial* (vertisol) soil types. This last category, which is characteristic of the central floodplain, features chipped stone and ground stone evidence, but no mounds or ceramic finds. A few mounds were encountered in *barrial*, but they are located at the edge of archaeological sites and at the bottom of slopes, where alluvial soils concentrate. Finally, the majority of sites are located on slopes, elevated platforms, natural rock formations, or hills. Exceptions are sites placed on the alluvial plains covered by *granza* and *tierra normal*, or along seasonal streams.

In spite of the good surface visibility rates throughout the research area, ranging from medium to high with grasses not exceeding 40 cm in height, more than half of the mounds (65%) did not yield archaeological materials on their surface (Arteaga 2017, 132). Ceramics were the most ubiquitous finds associated to mounds, present on 46%, followed by chipped stone (40%) and ground stone (13%). Other material culture was only documented on less than 3% of the recorded mounds.

5.3 EXCAVATED CONTEXTS

5.3.1 AGUAS BUENAS

Site description

The site traditionally known as Aguas Buenas (Gorin 1990; Lange *et al.* 1992; Geurds & Terpstra 2017; Auziņa 2018) spreads throughout plots of land that are currently owned by Don Juan Suárez, Rolando Montes Suárez and Lázaro Villegas. Specifically, it is located west of La Garnacha stream, on the meander formed by the junction between this water source and another seasonal stream called Quebrada de Ánimas.

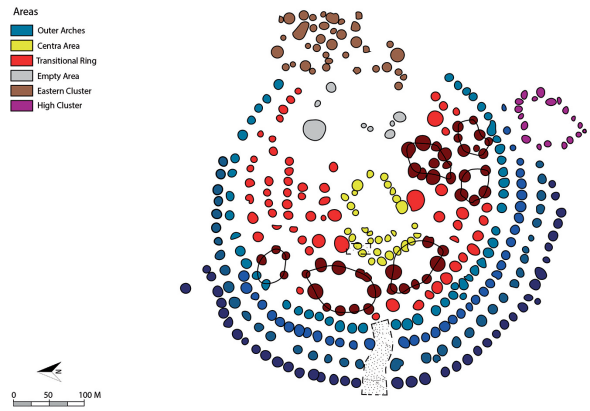


Figure 27: Map of Aguas Buenas highlighting the six different areas identified by Auzina (redrawn from Auziņa 2018, 89, fig. 29).

The site is covered by *lanilla* and *talpetate* soils (alluvial soils and litosol), which are currently employed for cattle pasture and maize agriculture. Therefore, the lots are mainly deforested and feature an assortment of grasses, but also a variety of trees such as Jiñocuabo (*Bursera Simaruba*), Jícaro (*Crescentia cujete* and *Crescentia alata*), Cortés (from the Tabebuia genre), Aceituno (*Simarouba amara*), Igualtil (*Genipa americana L.*), Chiquirín (*Myrospermum frutescens*), Cedro espinoso (*Pachira quinata*), and Nancite (*Byrsonima crassifolia*).

Modern use of the land includes habitation in rectangular houses that combine modern architectural features—mainly comprised of nails, tile, and zinc roofs—with more traditional construction practices that involve clays, grass, different types of wood, thatch, and occasionally some rocks (Llaudet 2019). Daily practices involve cattle ranching, agriculture—mainly corn and beans—and preparation of foodstuffs to be sold at the Juigalpa market.

The site features architectural intentions of symmetry and geometrical patterning that combine both circular and angular rationales; it covers approximately 28 hectares and comprises of at least 60 clusters of rock carvings and 371 man made mounds, which were grouped in six areas by Auzina (2018) (**figure 27**). These categories include the *Outer Arches*, the *Central Area*, the *Transitional Rings*, the *Empty Area*, the *Eastern Cluster*, and the *High Cluster*. A summary based on the findings provided by Auzina (2018) is provided in **Appendix 7**.

Mounds feature a combination of shared characteristics and variability. Both surface and excavation work conducted by PACEN (Geurds 2012; 2013a; 2014) suggest that these mounds were built directly on top of the bedrock, mostly using extracted bedrock blocks of 20 to 60 cm long, mixed with sediment (*tierra lanilla*) as well as ceramic and chipped stone fragments.[61] However, mounds show high variability in size, shape, construction materials, relationship to the landscape, and distance from each other. Still, the majority of the mounds (87%) have a circular shape; only 3% are oval, while the rest have an irregular outline. Auzina (2018, 61) characterizes five groups of mounds according to their diameter and five groups according to mound height. Her analysis reveals that only size and surface materials are relevant variables for examination, since the rest of the attributes show more regularity than variability. This homogeneity of construction practices, together with the clear architectural configuration, suggests an intended construction endeavour (Joyce 2004). Auzina's spatial analysis indicates a non-dichotomic combination of organic growth and planned development. According to Auzina's (2018, 83) calculations, the site was probably constructed over a period of 100 and 400 hundred years.

Material culture densities on the surface of the site are very low, meaning that very few fragments of ceramics and lithic artifacts are visible on the ground. While 89% of the mounds had no association to surface finds, only 11% of the man-made structures featured material culture on their surface. This exceptional trait is almost exclusive to the northeastern section of the site, which showed surface materials that suggest a more intensive use of the area (Auziņa 2018, 105). Mounds at the *Eastern Cluster* also feature differential shapes (oval and rectangular) that stand out from the rest of the site (see **Appendix 7**).

The extension of the site beyond the geometrical pattern is still under examination. However, survey on the highlands north of AB confirmed that it served as a natural boundary. Also, the cliff located to the south and the east, which precedes La Garnacha stream, functioned as a natural boundary for the mound configuration. To the south and the west, Las Ánimas stream forms a natural boundary together with La Garnacha. However, it is important to mention that there is a gap of 250 m between the outermost arc of mounds and this other stream, where no structures were built. Therefore, the west boundary of the site is unclear. The Aguas Calientes hill offers unique visibility of the site, allowing a viewer to perceive the geometric patterns of the mounds and the main access (Auziņa 2018, 131), so it could also be considered a natural boundary. Beyond these ideas on the site's boundary, the relationships between the Aguas Buenas complex and the hundreds of mounds surveyed and mapped around it, especially south and southeast of it, are still under examination.

According to Gorin (1990), Aguas Buenas' chronology spans the Cuisalá (400 - 800 CE) and Potrero (800 - 1200 CE) phases in the northern sections, with a Cuapa (1400 - 1600 CE) component. This later moment, as mentioned above, included building practices that do not follow the previous site design and was interpreted as domestic, in contrast to the rest of the site (A. Geurds, pers. comm. 2014). Spatial analysis of the site also suggests different developmental phases that included both highly planned areas and naturally grown sections, corresponding with Gorin's assessment based on surface ceramics that includes the three phases mentioned above. According to Auzina (Auziņa 2018, 130), the earliest moments of Aguas Buenas are related to the construction of the *Central Area*, the *Outer Arches*, and probably the *High Cluster*. In its original configuration, it is feasible that the *Outer Arches* covered the *Transitional Ring* and maybe also the *Empty Area* as well (Auziņa 2018, 136). Then, possible changes in the use or meaning transformed the spatial logic, and the *Transitional Ring* was built. Finally, the *Eastern Cluster* corresponds with a later phase of occupation, oriented towards daily practices. Due to the multicomponent characteristics of the site and the spatial distribution of its surface materials, six different 2x2 m stratigraphic pits were placed in different portions of Don Juan Suárez' lots, covering the following sections of the site: the *Eastern Cluster*, the *Empty Area*, the *Central Area*, and the *Transitional Ring* (**figure 28**). Previous excavations led by Geurds have already sampled the *Outer Arches*, and materials from Mound 1 are briefly discussed in Chapters 7 and 8.

61 Mound 34 also yielded a loose bedrock fragment with carvings, and Mound 1 featured small complete vessels, including a shoe pot (coiled) and a calabash shaped vessel (the only vessel within the whole dataset fashioned from a clay mass).

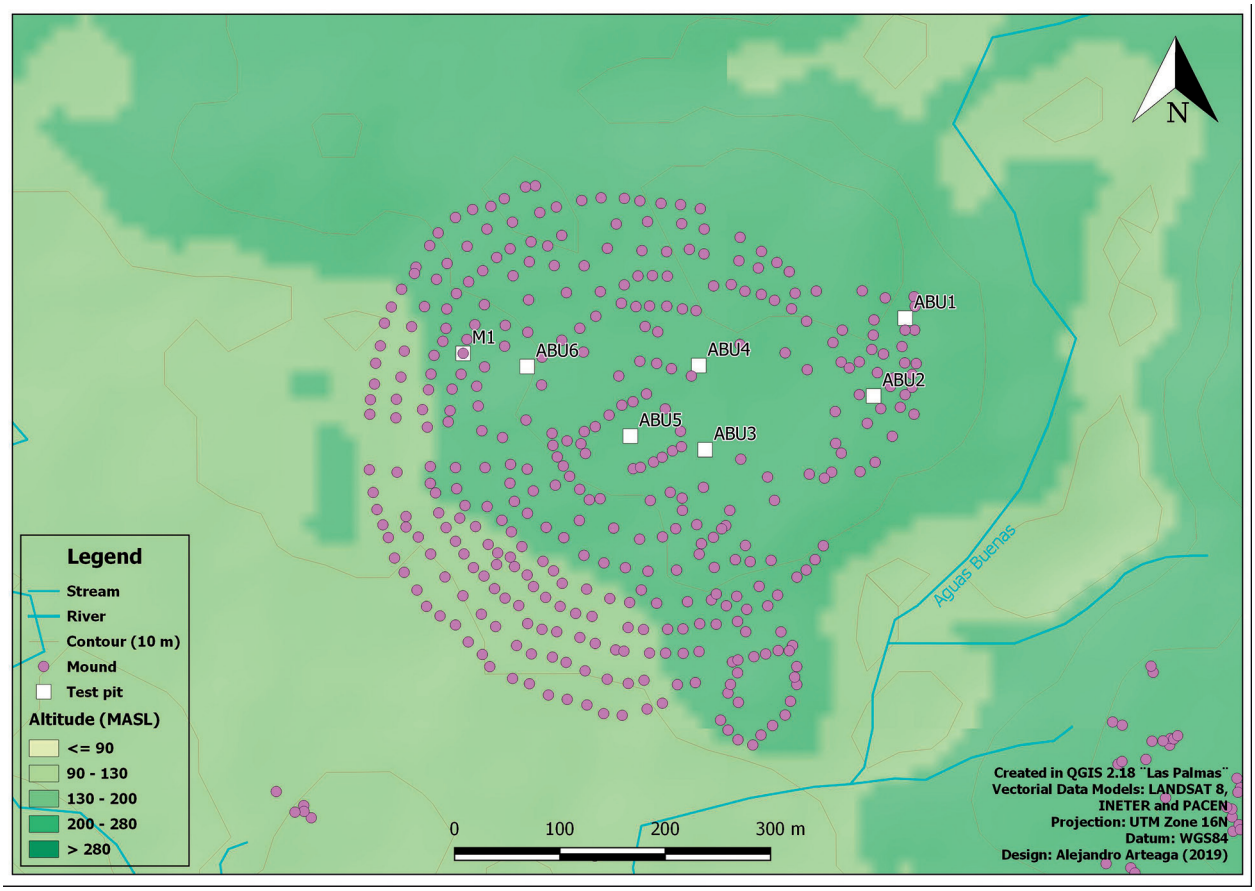


Figure 28: Map of Aguas Buenas including the location of the six different test pits excavated in 2015 and highlighting M1, excavated in 2012 (credit: Alejandro Arteaga).

Excavation units 1 and 2 (AB1, AB2) were placed within the *Eastern Cluster* to test the hypothesis of its later development based on surface materials, spatial organization and morphology of the architectural remains through controlled stratigraphic excavations. AB1 was located on the highest part of that portion of the terrain, between Mounds 365 (7 m wide, oval shape) and 367 (circular). AB2, on the other hand, was placed on the lower side of the lot, in order to compare its cultural and geological stratigraphy to AB1. Excavation units 3 and 4 (AB3 and AB4) were located in the *Empty Area*. While AB3 was specifically situated in the southern portion of this section, east of the *Central Area*, AB4 was placed at the northern part of the *Empty Area*, approximately 30 m west of Mound 272, the largest structure of the site. Excavation unit 5 (AB5) was positioned at the core of the *Central Area*, a low plain terrain that gets flooded every rainy season. Excavation unit 6 (AB6) was situated on the northwest side of the *Transitional Ring*, specifically within one of the mound clusters located on elevated land. Rodrigo Angeles Flores tried to set up a seventh excavation unit on the northwesternmost sector of the *Outer Arches*; however, bedrock was found a few centimeters from the surface, so the pit was discontinued. As a result, materials from Mound 1, located on the *Outer Arches* (fourth arch counting from outside to inside), were then included in this analysis. The only area that was not excavated was the *High Cluster*, due to time and logistical issues. In spite of that, sampling of all the areas mentioned above should generate sufficient data to test Auzina's temporal hypothesis for Aguas Buenas.

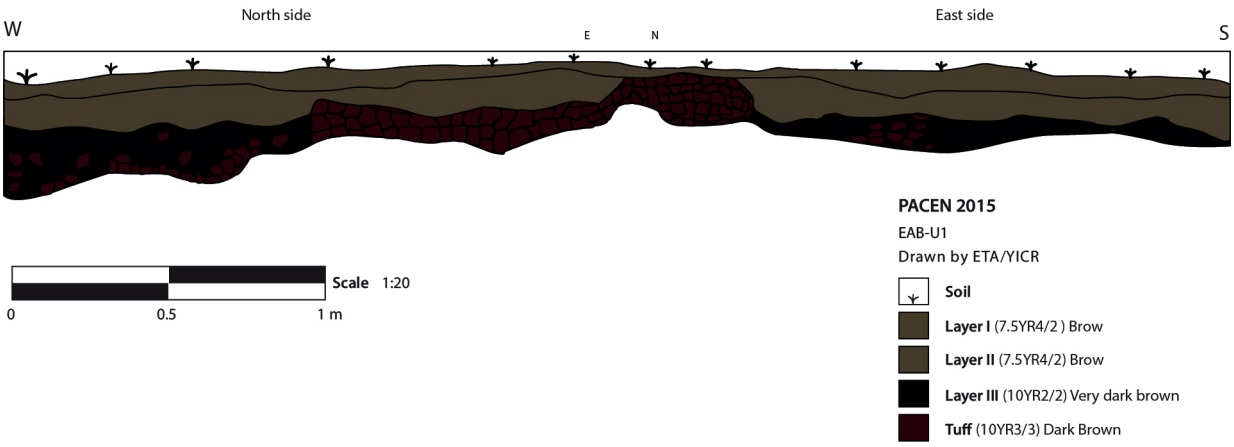


Figure 29: Drawing of Aguas Buenas excavation unit 1 (EAB1), northern and eastern profiles.

Figure 30: Photograph of Aguas Buenas excavation unit 1 (EAB1), eastern profile.

Stratigraphy at Aguas Buenas

All units excavated in Aguas Buenas feature similar stratigraphy (**figures 29 and 30**), characterized by a minimal presence of the O soil horizon, which is a consequence of the modern use of the land, which has turned it into grasslands. Within the eluvial zone, horizon A (the topsoil) was a light grey *lanilla*, full of organic materials, such as grass roots and insects, as well as low densities of material culture in all units, except for AB6. Horizon AE had a slightly lighter color, possibly due to the combination of the loss of humidity and the appearance of volcanic tuff particles, which are light grey. This horizon presented the majority of the material culture remains (AB3 is the only exception), so it is considered the core cultural stratigraphic portion of human presence in the site. In the illuvial zone, horizon AB consisted of a more iron, clay, and aluminum rich soil, with a darker color. It still presented material culture remains but in lower densities than the previous horizon. AB3 is an exception to this, with the bulk of its material culture evidence present within this horizon. Horizon C, or the partially altered parent rock, was characterized by the strong presence of fragmented volcanic tuff, which could still yield some material culture. Finally, Horizon R, the bedrock, consisted of continuous masses of hard rock, which were archaeologically sterile.

EAB1

Five arbitrary levels of 10 cm each were excavated, and four stratigraphic units were identified, which all yielded ceramic and chipped stone fragments. Levels 3 and 4 also presented burnt clay, and Level 3 yielded organic remains as well. Also, fragments of stone were retrieved consistently (R_1 and R_2), which seem to have been a product of the degradation of surrounding mounds. This hypothesis is supported by the fact that archaeological remains were found both on top (Layers T, II_1, II_2, and III), in between (III) and underneath these rocks (III and IV). Therefore, the structures were possibly filled with sediment, small rocks, and archaeological materials, which were deposited first on top of the last occupied surface as a product of the collapsing process of the structure. Then, larger rocks used to build low retaining walls collapsed (R_1 and R_2),

Layer/Level Graph	I1(3,00-10,00 cm)	II2 (10,10-20,00 cm)	III3 (20,10-30,0 cm)	IV3 (20,10-30,00 cm)	V4 (30,10-40,00 cm)	V5 (40,10-50,00cm)	Totals
CER #	78,00	1751,00	11,00	55,00	0,00	0,00	1895,00
CER w	372,60	8226,50	88,20	378,00	0,00	0,00	9065,30
CS #	75,00	699,00	6,00	12,00	0,00	0,00	792,00
CS w	44,90	1166,10	14,30	24,90	0,00	0,00	1250,20
GS		X					
AB		X					

Table 4: Distribution of materials collected from Aguas Buenas excavation unit 2 (EAB2). CER # accounts for the number of sherds retrieved, while CER w stands for the weight (in grams) of the ceramic fragments. CS refers to chipped stone, GS to ground stone, and AB to animal bone.

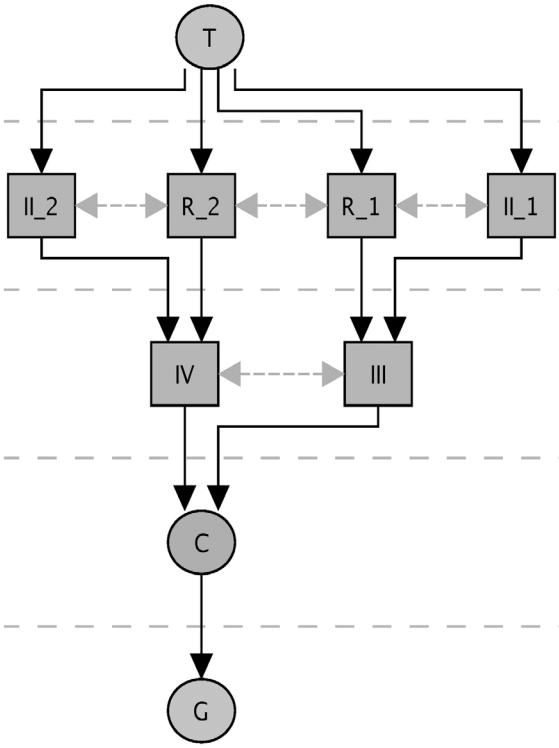


Figure 31: Harris matrix model for Aguas Buenas excavation unit 1 (EAB1).

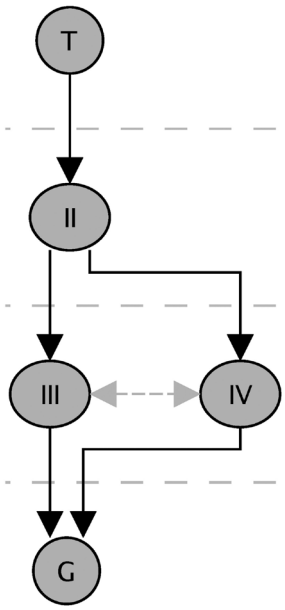


Figure 32: Harris matrix model for Aguas Buenas excavation unit 2 (EAB2).

to finally give way again to more of the filling, no longer contained by the rocks (**figure 31**). Finally, towards the northeast corner of the unit, a possible leveling of the bedrock was identified (C). The deepest sections of IV (55 to 60 cm) were sterile, and bedrock (G) was reached afterwards, with some outcrops as shallow as 10 cm.

EAB2

In this unit, five arbitrary metric levels of 10 cm were excavated, and five different stratigraphic units were identified (**figures 32 and 33**). Sterile bedrock (V or G) was reached at 20 cm at its shallowest point and 50 cm at its deepest. Layers I (T), III, and IV yielded both ceramics and chipped stone (see **table 4**), while II also featured those types of material culture, but also ground stone, burnt clay, and an animal tooth fragment identified as *Odocoileus virginianus* (White-tailed Deer).III appears to be a floor and/or leveling of the bedrock, and IV featured a burnt clay concentration

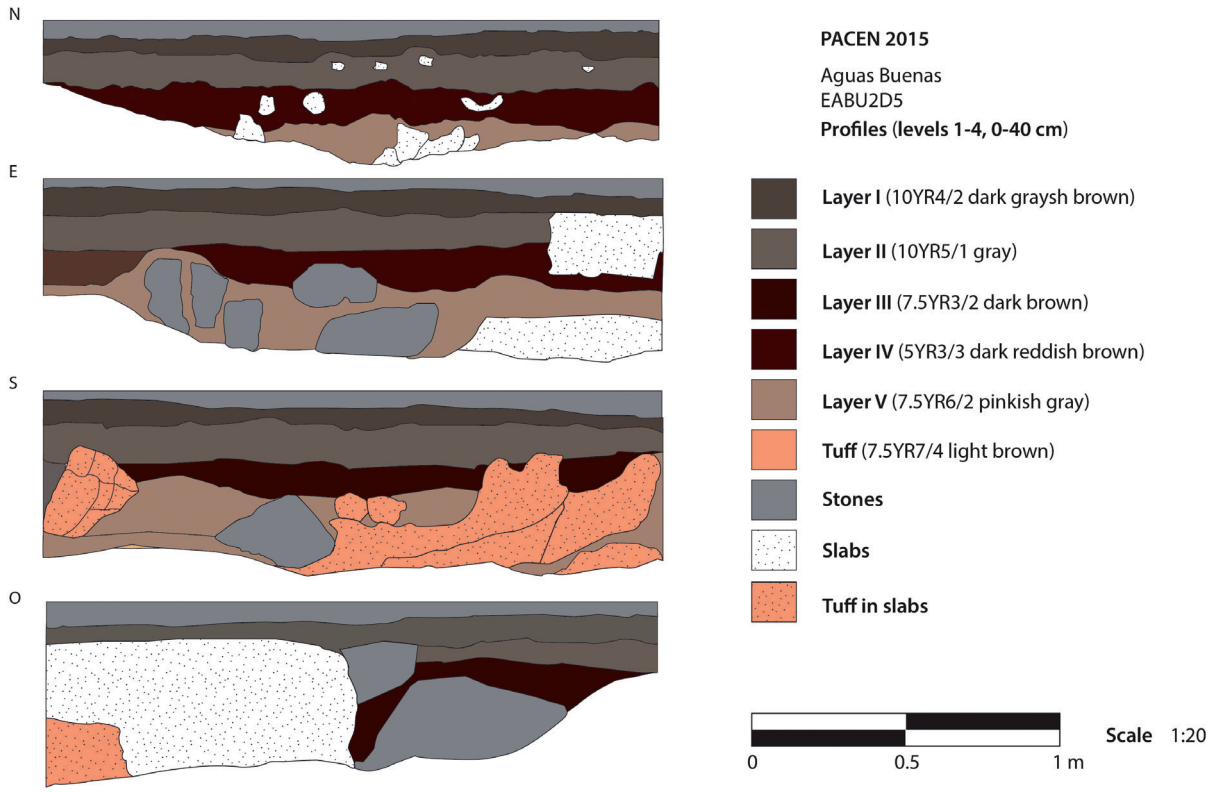


Figure 33: Drawing of Aguas Buenas excavation unit 2 (EAB2) profiles.

towards the north profile of the pit, as well as a very small fragment of faunal bone (<3 mm), which was recovered through flotation. II is the stratigraphic unit that yielded most of the materials found in the excavation unit.

EAB3

Five arbitrary metric levels of 10 cm were excavated, and the same number of stratigraphic units were identified (**figures 34 and 35**). Layer I only featured chipped stone, while II, III, and IV yielded both ceramic and chipped stone fragments. Ceramic densities were higher within the first levels, and the sherds' size also reduced when reaching deeper levels (see **table 5**). This unit did not feature large rocks or any evident modification of the terrain, so the materials might have come from the surrounding mounds or practices performed in the area. V (G) consisted of the bedrock.

Right - **Figure 34:** Harris matrix model for Aguas Buenas excavation unit 3 (EAB3).

Layer/Level Graph	I (0,10-10,00 cm)	II2 (10,10-20,00 cm)	III2 (10,10-20,00 cm)	IV2 (12,00-20,00 cm)	II3 (20,10-26,00 cm)	III3 (20,10-28,00 cm)	IV3 (20,10-30,00 cm)	V3 (20,10-30,00 cm)	IV4 (30,10-40,00 cm)	V4 (30,10-40,00 cm)	V5 (40,10-50,00 cm)	Totals
CER #	0,00	51,00	0,00	0,00	0,00	160,00	0,00	0,00	31,00	0,00	0,00	242,00
CER w	0,00	201,90	0,00	0,00	0,00	700,20	0,00	0,00	188,10	0,00	0,00	1090,20
CS #	60,00	20,00	6,00	0,00	0,00	0,00	0,00	0,00	2,00	0,00	0,00	88,00
CS w	45,90	35,20	22,70	0,00	0,00	0,00	0,00	0,00	7,70	0,00	0,00	111,50

Table 5: Distribution of materials collected from Aguas Buenas excavation unit 3 (EAB3).

Figure 35: Photograph of Aguas Buenas excavation unit 3 (EAB3), western profile.

EAB4

Five arbitrary levels were excavated, and four different stratigraphic units were identified (**figures 36 and 37**). The first three layers (I or T, II, and III) yielded ground stone, chipped stone, and ceramic fragments (see **table 6**). SIII only featured archaeological materials in level 3 because in deeper levels, a transition to the next stratigraphic unit was marked by tuff fragments and bedrock outcrops. In contrast to the previous excavations in the site, stratigraphy in this unit was uniform, and a sterile layer (III) was identified before the bedrock (IV or G).

Right - **Figure 36:** Harris matrix model for Aguas Buenas excavation unit 4 (EAB4).

Layer/Level Graph	I1 (0,1-10cm)	II1 (4,00-10,00 cm)	II2 (10,41-20,00 cm)	III2 (19,00-20,00 cm)	II3 (20,10-28,00 cm)	III3 (20,10-30,00 cm)	III4 (30,10-40,00 cm)	III5 (40,10-50,00 cm)	IV5 (46,00-50,00 cm)	III6 (50,10-54,00 cm)	IV6 (50,10-60,00 cm)	Totals
CER #	0,00	3,00	65,00	1,00	7,00	0,00	0,00	0,00	0,00	0,00	0,00	76,00
CER w	0,00	17,30	655,00	4,70	76,90	0,00	0,00	0,00	0,00	0,00	0,00	753,90
CS #	4,00	5,00	37,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	46,00
CS w	2,80	4,70	119,10	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	126,60
GS						X						
BC			x									

Table 6: Distribution of materials collected from Aguas Buenas excavation unit 4 (EAB4).

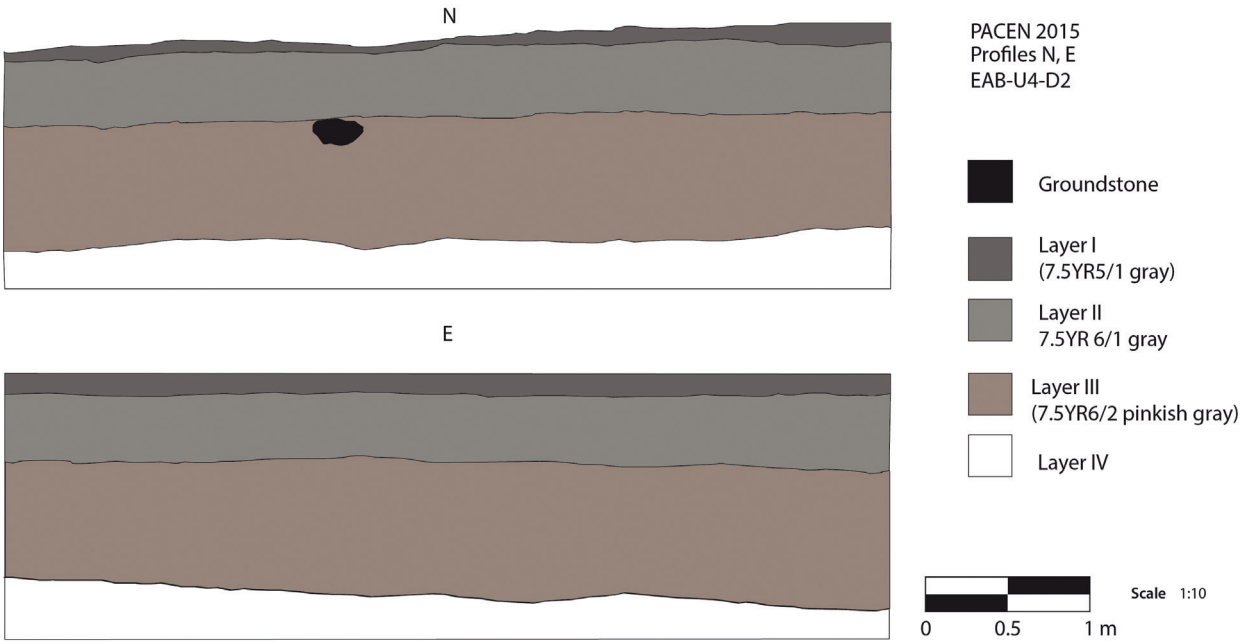


Figure 37: Drawing of Aguas Buenas excavation unit 4 (EAB4) northern and eastern profiles.

EAB5

Seven arbitrary levels were excavated, and five stratigraphic units were recognized (**figures 38 and 39**). Only layers II and III yielded ceramics (see **table 7**). Additionally, II featured chipped stone and ground stone fragments. Except for these two layers, the rest of the stratigraphic units consisted of sterile clayish soils, which flood seasonally in a way that modern cattle come to drink water at this location. Due to the low material culture densities, excavations of the sterile V (or G, bedrock) were continued from level 6 (50-60 cm) in half of the pit (1 x 2 m), whereas the last level (until 70 cm) was reduced even more to a 0.5x1 m window. Throughout the unit, several dark brown spots were found, which could indicate higher

Right - **Figure 38:** Harris matrix model for Aguas Buenas excavation unit 5 (EAB5).

Layer/Level Graph	II1 (2-10 cm)	II2 (10.1-20 cm)	III2 (10.1-20 cm)	III3 (20.1-30 cm)	IV3 (27-30 cm)	III4 (30.1- 40 cm)	IV4 (30.1-40 cm)	IV5 (40.1-50 cm)	IV6 (50.1-52 cm)	V6 (50.1-60 cm)	V7 (60.1-70 cm)	Totals
CER #	3	12	2	4	0	1	0	0	0	0	0	22
CER w	2.2	105	1.4	11.8	0	2.1	0	0	0	0	0	122.5
CS #	1	15	1	0	0	0	4	0	0	0	0	21
CS w	2.7	70.9	66.7	0	0	0	116	0	0	0	0	256.3

Table 7: Distribution of materials collected from Aguas Buenas excavation unit 5 (EAB5).

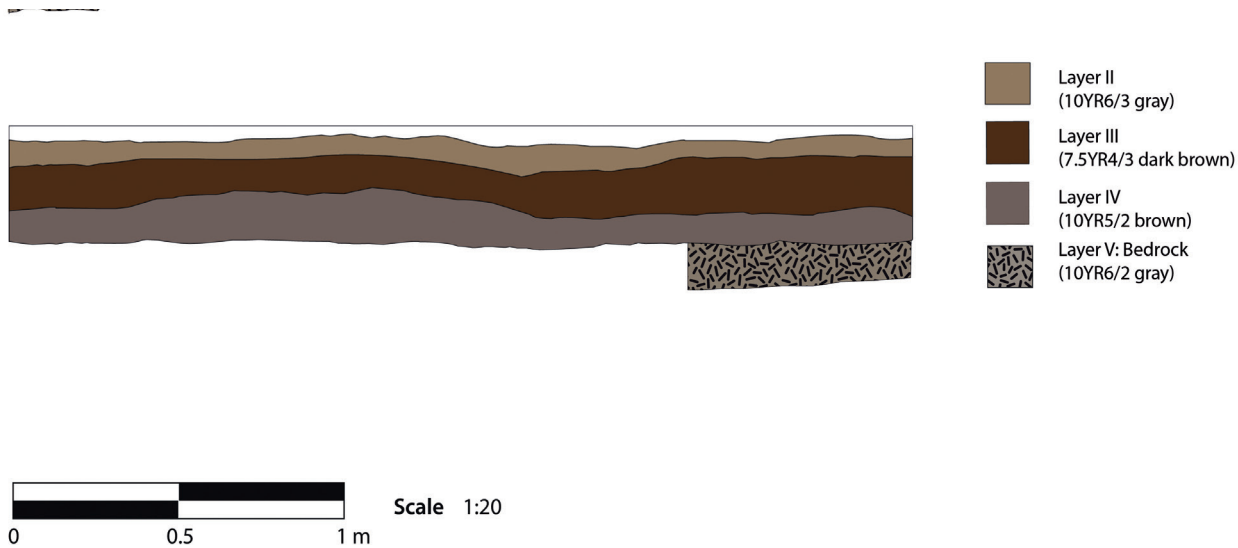


Figure 39: Drawing of Aguas Buenas excavation unit 5 (EAB5) northern and southern profiles.

Figure 40: Harris matrix model for Aguas Buenas excavation unit 6 (EAB6).

organic content; however, no macroremains were recovered during the flotation process. This unit is different from the rest because the bedrock was not preceded by a layer that already included fragments of eroded tuff (Horizon C). The density of material culture was minimal in comparison with the rest of the units, which is probably related to taphonomic processes linked to the flooding episodes as well as to the original use of the space.

EAB6

In this unit, we excavated four arbitrary 10 cm levels and three stratigraphic units (**figures 40 and 41**). Layers II and III yielded ceramic fragments, but II also featured chipped stone and ground stone (see **table 8**). Only the first two levels yielded archaeological materials, and the rest were completely sterile. Stratigraphy of this unit was very similar to AB3 and AB4, so we can infer that the taphonomic processes of these open areas, and/or the practices associated to them, were similar.

Layer/Level Graph	I1 (0,10-10,00 cm)	II1 (4,00-10,00 cm)	II2 (10,10-20,00 cm)	III2 (12,00-20,00 cm)	II3 (20,10-30,00 cm)	III3 (20,10-30,00 cm)	III4 (30,10-40,00 cm)	III5 (40,10- 50,00 cm)	III6 (50,10-60,00 cm)	Totals
CER #	0,00	0,00	27,00	0,00	26,00	0,00	0,00	0,00	0,00	53,00
CER w	0,00	0,00	84,00	0,00	113,90	0,00	0,00	0,00	0,00	197,90
CS #	0,00	0,00	8,00	0,00	5,00	0,00	0,00	0,00	0,00	13,00
CS w	0,00	0,00	16,90	0,00	23,10	0,00	0,00	0,00	0,00	40,00

Table 8: Distribution of materials collected from Aguas Buenas excavation unit 6 (EAB6).

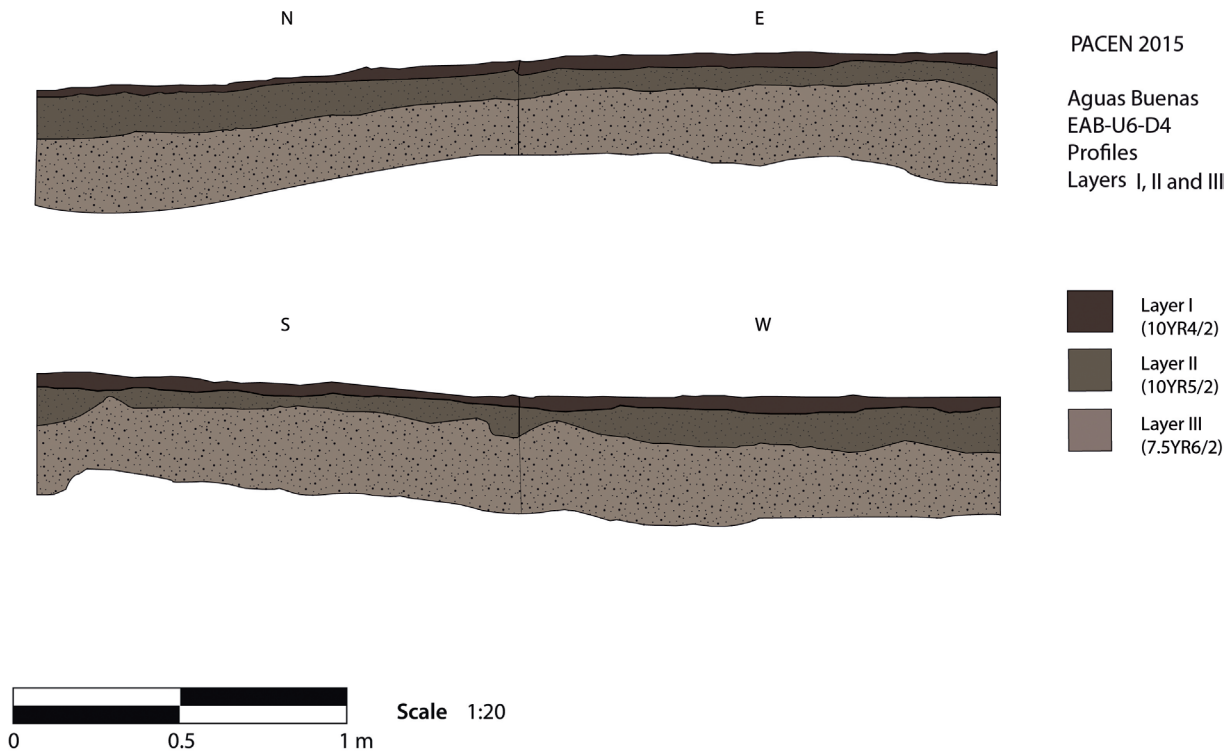


Figure 41: Drawing of Aguas Buenas excavation unit 6 (EAB6) profiles.

Figure 42: Photograph of M1 after quadrant excavation (courtesy of Roosmarie Vlaskamp) and Harris matrix model.

Mound 1

M1 was excavated during the 2012 season, using the quadrant method to expose the northeast and southwest portions of the structure (Geurds 2012). Stratigraphic analysis of the excavation data suggests the presence of five stratigraphic units, of which two are geological and three archaeological (**figure 42**). Following the order of the construction practices, it is probable that the first layer was formed by an outer ring of large rocks (R, measuring 50-60 cm), which served as a retaining wall for the foundation of the mound. Afterwards, a layer comprised of ceramics and sediment was placed right above the bedrock (SIII), which was in turn covered by another stratum made of rocks and sediment (90% and 10% respectively), which comprised the bulk content of the mound (II). Finally, a thin depositional stratigraphic unit was found on top of the structure. In general, material culture was mainly recovered from stratigraphic unit III, which was placed at the beginning of the construction.

5.3.2 ALBERTO OBANDO

Site description

The lot owned by Alberto Obando is located 500 m west of Aguas Buenas's northernmost *Outer Arches* and northeast of the Aguas Calientes hill. Also, the site is situated in the foothills of the Amerrisque mountains to the north and west of Quebrada de las Ánimas, the stream that flows into La Garnacha and serves as a possible boundary for AB. Since the lot is used exclusively for cattle pasture, surface soil and vegetation are similar to AB, but modern houses were not built within its boundaries.

The site is covered by *lanilla* (alluvial) soil, which is covered by improved grasses. The type of *lanilla* found in AO is considered by locals as a special, or pure, kind, since it has the best qualities for making clay houses in the traditional way. Even though the lot is mainly deforested, it features a variety of trees such as Jiñocuabo (*Bursera Simaruba*), Jícaro (*Crescentia cujete* and *Crescentia alata*), Chiquirín (*Myrospermum frutescens*), and Pochote (*Bombacopsis quinata*).

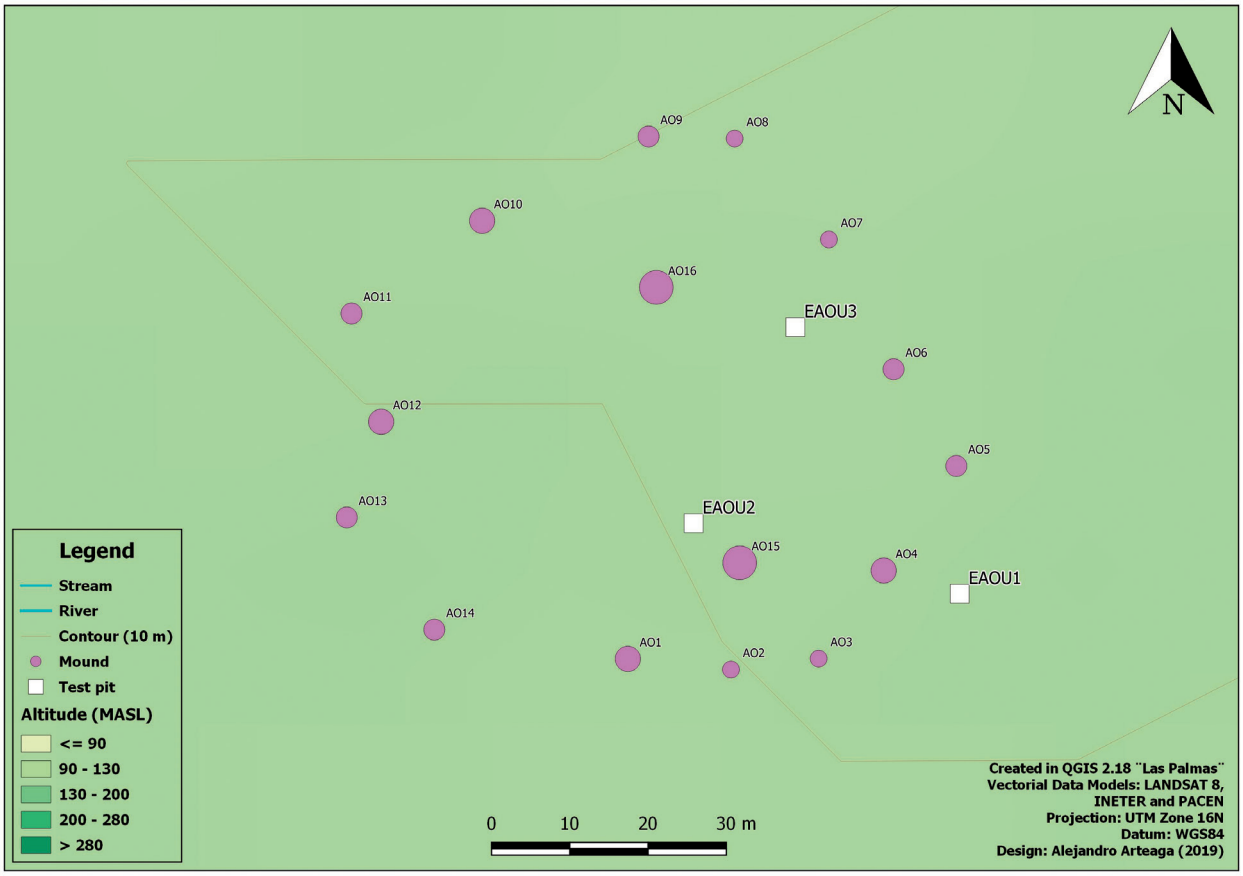


Figure 43: Alberto Obando site plan featuring excavation units (credit: Alejandro Arteaga).

The site is comprised of 16 circular mounds (**figure 43**) that average 31 cm in height and 589 cm in diameter, built on a flat terrain that softly slopes towards the south—where a creek is found—and towards the east, a terrain that floods seasonally. Currently, a dirt road that connects the Aguas Buenas and Aguas Calientes communities cuts the site in two, leaving one mound (M14) in the middle of the road. Structures are all circular and homogeneous in size, except for mound 17 (M17), placed at a central location within a circular arrangement of mounds. This resembles the spatial logic present in AB, especially the *Outer Arches* and the *High Cluster*, as well as similar mound clusters within Lázaro Villegas' terrain. This central[62] mound is 1100 cm wide and 130 cm height, which contrasts with the rest of the structures, which do not exceed 70 cm. Morphologically speaking, it is also different, because it consists of an elevated foundation, whereas the rest of the site is comprised of circumscribed leveled elevations. The other mound located within this circular arrangement is mound 16 (M16), which is also larger—800 cm diameter and 69 cm in height—than the rest. Construction practices seem to have been homogenous; the majority of the mounds feature an outer ring formed by blocks from extracted bedrock, then filled with a mixture of sediment, rock, and material culture.

Most mounds featured materials visible on the surface in low and medium densities, and chipped stone was more commonly found than ceramics. Ground stone or other types of archaeological evidence were not visible at the surface. As this was a previously unrecorded site, no chronological hypotheses were available by the time the excavations took place.

Three different stratigraphic pits of 2x2 m were placed throughout the site (see **figure 43**). Excavation unit

62 This is not a hierarchical assessment; "central" refers to its location within the mound arrangement.

Layer/Level Graph	I1 (8,00-10,00 cm)	I2 (10,10-20,00 cm)	II2 (13,00-20,00 cm)	II3 (20,10-30,00 cm)	III3 (27,00-30,00 cm	II4 (30,10-33,00 cm)	III4 (30,10-40,00 cm)	IV4 (36,10-40,00 cm
CER #	0,00	0,00	0,00	0,00	687,00	0,00	0,00	69,00
CER w	0,00	0,00	0,00	0,00	2560,70	0,00	0,00	314,40
CS #	0,00	3,00	5,00	0,00	362,00	0,00	0,00	52,00
CS w	0,00	1,20	3,00	0,00	633,40	0,00	0,00	60,60
BC					X			

Layer/Level Graph	III5 (41,00-46,00 cm	V5 (40,10-50,00 cm	V5 (44,00-50,00 cm	IV6 (50,10-60,00 cm	V6 (50,10-60,00 cm	IV7 (60,10-69,00 cm	V7 (60,10-70,00 cm)	V8 (70,10-80,00 cm)	Totals
CER #	0,00	56,00	0,00	0,00	0,00	0,00	0,00	0,00	812,00
CER w	0,00	200,00	0,00	0,00	0,00	0,00	0,00	0,00	3075,10
CS #	24,00	0,00	1,00	0,00	0,00	0,00	0,00	0,00	447,00
CS w	61,90	0,00	71,40	0,00	0,00	0,00	0,00	0,00	831,50
BC									

Table 9: Distribution of materials collected from Alberto Obando excavation unit 1 (EAO1).

Figure 44: Harris matrix model for Alberto Obando excavation unit 1 (EAO1).

AO1 was located south of the site, on a flat surface between mounds M5 and M6. Excavation unit AO2, on the other hand, was placed west of the main mound. Finally, excavation unit AO3 was situated on the flat part of the terrain, outside of the circular mound arrangement.

Stratigraphy at Alberto Obando

All units excavated in Alberto Obando were characterized by a very thin O soil horizon, usually 1-3 cm deep, which is possibly a consequence of the modern use of the land, which has turned it into grasslands. Excavation unit EAO1 featured its core archaeological stratigraphy within Horizon AB, while excavation units EAO2 and EAO3 showed their cultural component within Horizon AE. Horizons A, AE, AB, C and R showed very distinct characteristics within each unit, or were absent or not excavated, so they will be described separately.

EAO1

Six arbitrary metric levels of 10 cm each were excavated, and five different stratigraphic units were identified (one cultural, four geological, see **figure 44**). After the minimal O horizon, within the eluvial zone, followed horizon A (the topsoil), a brown soil with moderate content of organic materials, such as roots, grass, and seeds, as well as a few fragments of chipped stone (I, or T). Horizon E (II) had a lighter color—gray—possibly due to the loss of humidity and organic matter and continued with a very low density of chipped stone fragments. Within the illuviation zone, Horizon B (III), of a pinkish gray color (darker than Horizon E) was rich in iron, clay, aluminium and organic compounds. Also, it presented the highest density of material culture of the excavation unit, including ceramics, chipped stone and burnt clay—which was exclusive to III (**table 9**). Therefore,

Figure 45: Photograph of Alberto Obando excavation unit 1 (EAO1) northern profile.

Figure 46: Photograph of Alberto Obando excavation unit 2 (EAO2) southern profile.

this cultural stratigraphic unit is interpreted as the core cultural layer of the excavation unit, also containing the highest density of finds throughout the site. Horizon C (IV), of a very dark gray color, was characterized by an abrupt decrease of finds and the presence of fragmented volcanic tuff. Finally, horizon R, the bedrock (V), almost did not contain any soil at all, but only fragmented bedrock and bedrock masses, with a minimal quantity of chipped stone fragments. The northeast section of the unit features a depression (**figure 45**), which is not necessarily interpreted as a cut, but could correspond with natural wear of the bedrock resulting from practices that took place around mound M16, such as walking, channeling water, or construction traces, for example. Excavations of V deeper than 60 cm were continued on a 50x50 cm window at the northeast section of the pit (**figure 45**), and these last 10 cm were completely sterile.

EAO2

Five arbitrary 10 cm levels were excavated, and eight stratigraphic units were identified (one cultural, the rest geological, see **figure 46**). Generally, the stratigraphy of this unit, located northwest of the central mound, was more complex than in the other two excavation units. After the minimal O horizon and within the eluvial zone, followed horizon A (I), a light brownish grey *lanilla*, with low contents of organic materials, mainly seeds as well as very low quantities of ceramic sherds and chipped stone. Horizon E (II) had a lighter color—gray—possibly due to the combination of a loss of humidity and organic matter together with the presence of tuff inclusions. Material culture density increased (also ceramics and chipped stone finds) and several fragments of charcoal (<2 mm) were present. Also, stratigraphic unit II showed the highest density of material culture and featured medium sized stones (15 cm wide) oriented towards the mound. This soil profile was characterized as an AC soil because Horizon B was absent; however, one stratigraphic unit (V), of a dark brown color, could represent some accumulation of minerals transported from above. Below, Horizon C was divided into two groups of stratigraphic units. First, (III, VI, VII, VIII), of a whitish color, were characterized by fragmented parent material and minimal material culture. In this respect, III yielded ceramic sherds, and chipped stone, while VI and VIII only presented chipped stone and VIII was archaeologically sterile. Second, IV, of light grayish brown color, contained some small fragments of charcoal and fragmented volcanic tuff. In this unit, horizon R was not reached and after a depth of 50 cm, excavations continued only on the south section of the pit, where 60 cm in depth was reached. This last arbitrary level, part of VI, was sterile.

Figure 47: Photograph of Alberto Obando excavation unit 3 (EAO3) taken from the west.

Figure 48: Photograph of Alberto Obando excavation unit 3 (EAO3) taken from the north, featuring the visible SIII modifications of the bedrock.

EAO3

Six arbitrary metric levels of 10 cm each were excavated, and eight stratigraphic units were identified (one cultural, one geological but modified, six geological, see **figure 47**). This excavation unit yielded the lowest quantity of material culture. Excavation unit EAO3 was characterized by a minimal Horizon O, followed by Horizon A (I) of a brown color, which lacked material culture but included organic remains such as roots, charcoal, grass, and insects. Within the eluviation and leaching zone, Horizon E (II), of a grayish brown color, still contained the same type of organic matter as the horizon above, but was the only one to feature archaeological finds, comprised of both ceramics and chipped stone. This stratigraphic unit also featured a tooth fragment that belonged to *Bos taurus* (Domestic Cow) within the first 15 cm of excavation, so it could correspond with bioturbation. This soil profile was, as in EAO2, an AC soil because it lacked Horizon B. Therefore, Horizon C (IV and V) was found immediately below Horizon E and was sterile. Horizon R (III), with minimal ceramic finds, featured a unique modification: bedrock was intentionally cut 11 cm below surface level, with an almost perfect north-south orientation, creating two features. First, a semi-circular 40 cm wide carving created a set of two steps (approximately 15 cm high each) and a base for placing a semi-rounded feature (**figure 48**). Second, this intentional removal of the bedrock created a bedrock platform, elevating the architectural portion of the site. This could have served many purposes, such as a raw material resource for mound building practices, channeling of rainwater, enhanced visual exposure of the mounded area, or access to the mounded sector of the site, for example. The feature resembles a kiln, but the absence of charcoal and minimal material culture finds recovered make that hypothesis hard to verify. After a depth of 60 cm, excavations continued only within the eastern portion of the pit. No archaeological materials were found between 60 and 70 cm, so the excavations were stopped.

5.3.3 LA AVENTURA

Site description

The farm called "La Aventura" is owned by Jackson Arellano and is located on elevated terrain, at the south foot of the Güegüestepe hill, less than 100 m east of the Mayales river and 800 m northwest of Juigalpa. This area of the Mayales river is characterized by three pronounced meanders. The site is situated east of one of these curves in the river course, within Mr. Arellano's and Irene Rocha's lots, which are separated by a fence that runs in an east-west direction. Additionally, four mounds were placed on Lenin Molina's land, to the east. The area is accessible on foot by pedestrian paths that run through the valley, but locals—including the people who live in the Güegüestepe community—prefer to enter the farm by crossing the Mayales river and then connect with the Juigalpa-Cuapa road. The crossing of the Mayales in this area is possible by car (in

Figure 49: La Aventura site plan featuring excavation units (credit: Alejandro Arteaga).

both seasons), and foot, horse, donkey, bicycle, and motorcycle (only during the dry season).

Nowadays, the lot, which features *lanilla* (alluvial) soil and lithosols, as well as bedrock outcrops, is used for cattle ranching. Vegetation is mainly comprised of grasses due to deforestation, but various tree varieties are found within the lots, such as Jiñocuabo (*Bursera Simaruba*), Tamarindo (*Tamarindus indica),* Jícaro (*Crescentia cujete* and *Crescentia alata*), Madero (*Gliricidia sepium*), Chiquirín (*Myrospermum frutescens*), Igualtil (*Genipa americana L.*), Guasimo (*Guazuma ulmifolia*), and Chiquirín (*Myrospermum frutescens*). Even though the main activity is cattle ranching, Jackson Arellano's land, where we conducted the majority of the excavations, also features a modern house, built with concrete walls and floors, as well as zinc roofing. Also, there are two sheds and a latrine next to the house. Currently, nobody lives at the farm, since the family moved to Juigalpa.

The site is comprised of 22 man-made mounds and archaeological finds on the surface (**figure 49**). Architectural remains consist of circular and ovular structures, forming three different clusters plus an isolated mound. Two of these clusters were built on the floodplain and one on the Güegüestepe foothill, while an isolated mound (IR01) was placed on the riverbank. Mounds average 49 cm in height and 766 cm in diameter, with six mounds (27% of the total) having diameters exceeding 900 cm and three of those featuring heights of 100 cm or more (120 cm maximum). No clear site design was identified, except for some clustering on the highest part (Jackson Arellano's section) that follows the slope and also features a rock alignment east of JA2 circumscribing the area around the mound, which is a large platform located at the foothill. This clustering also contains a relatively open area surrounded by mounds.

Construction practices involved first the placement of a circle made up of medium to large sized

rocks (quarried bedrock), filled afterwards with an assortment of extracted bedrock fragments of small to medium sizes, and possibly archaeological materials. Four mounds, with various sizes and heights, also featured river stones in the filling of their structures, a property only observed at the Barillas site, located a few kilometers north of La Aventura (see below). Also, excavation of the bedrock prior to building structures is a possibility backed up by excavation unit ELA2 (see below).

More than half of the mounds had visible archaeological finds on the surface, mostly in high and medium densities. Surface materials included ceramics (the most ubiquitous), chipped stone, ground stone (an axe fragment), a basalt column located in the open area of Jackson Arellano's lot, a few meters off of mound JA01. Also, tile roof fragments were abundant, especially at the northern portion of the site. As this was a previously unrecorded site, no chronological hypotheses were available by the time the excavations took place, but the possibility of contamination of pre-conquest contexts due to modern construction activities was taken into account.

Three different excavation units of 2x2 m each were excavated. ELA1 was placed on the open area between mound JA2 (1365 cm diameter, 96 cm high) and the rock alignment previously described. ELA2 was situated as an approximation pit to JA5 (125 cm diameter, 13 cm high), a low circular mound located north of JA2, that featured a visible circle of rocks surrounding the structure. Only the off-mound portion of the mound was excavated, as part of the excavation strategies outlined in Chapter 4. Finally, ELA3 was located on the flat terrain surrounded by mounds at Ines Rocha's lot, crossing Jackson Arellano's land to the south.

Stratigraphy at La Aventura

The three excavation units were shallow, only 30 to 40 cm in depth below the surface before reaching the bedrock. Excavation unit ELA1 featured the highest densities of archaeological finds, while ELA2 featured tile roof fragments in almost all layers. Soil Horizon A featured the highest densities in archaeological finds for units ELA1 and ELA2, while Horizon O was the densest at ELA3. Stratigraphic units were extremely varied, and very few were present across the excavation units. Therefore, description will be approached separately.

Figure 50: Harris matrix model for La Aventura excavation unit 1 (ELA1).

ELA1

Four arbitrary metric levels of 10 cm each were excavated, and five different stratigraphic units were characterized (I, II, IV, C, and R) (**figure 50**). Two of these stratigraphic units were geological, while one was cultural. Horizon A1 (I, or T) was of a dark gray color, and it contained organic matter such as roots, grass, and insects, as well as ceramics, chipped stone, zooarchaeological remains, and fragments of glass bottles (see **table 10**). Horizon A2 (II), which was also present in excavation unit ELA2, was of a dark brown color and still contained some organic matter (roots, charcoal, and grass). This stratigraphic unit featured the highest density of material culture of the excavation unit and the whole site, including ceramics, chipped stone, ground stone, zooarchaeological remains, as well as glass

Layer/Level Graph	I1 (4,00-10,00 cm)	I2 (10,10-16,00 cm)	II2 (11,00-20,00 cm)	IV2 (10,10-20,00 cm)	I3 (20,10-21,00 cm)	II3 (20,10-30,00 cm)
CER #	0,00	122,00	96,00	0,00	51,00	1143,00
CER w	0,00	666,20	618,90	0,00	274,00	6717,20
CS #	0,00	1,00	0,00	0,00	0,00	37,00
CS w	0,00	4,50	0,00	0,00	0,00	330,30
GS						X
AB		X				X
Glass					X	X

Layer/Level Graph	IV3 (20,10-30,00 cm)	II4 (30,10-40,00 cm)	IV4 (30,10-40,00 cm)	II5 (40,10-42,00 cm)	IV5 (40,10-50,00 cm)	IV6 (50,10-54,00 cm)	Totals
CER #	0,00	102,00	0,00	0,00	0,00	0,00	1514,00
CER w	0,00	641,00	0,00	0,00	0,00	0,00	8917,30
CS #	0,00	8,00	0,00	0,00	0,00	0,00	46,00
CS w	0,00	37,90	0,00	0,00	0,00	0,00	372,70
GS		X					
AB							
Glass							

Table 10: Distribution of materials collected from La Aventura excavation unit 1 (ELA1).

Figure 51: Photograph of La Aventura excavation unit 1 (ELA1) northern profile.

fragments. The finds were positioned horizontally and presented high compaction, so the archaeological stratigraphic unit was interpreted as a floor surface. Apart from that, this stratigraphic unit featured a possible cut (C) within its north profile, towards the west (in the direction of mound JA2), with a stone at its bottom (R, **figures 50 & 51**). Even though its inverted triangular shape could suggest a posthole or an intentional cut partially leveled with the rock, the homogeneity of II, right above and within it, argues against this interpretation. Horizons E and B were completely lacking, so below Horizon A, Horizon C was immediately found (IV). This layer was archaeologically sterile, consisted of fragmented bedrock of a greenish tone (**figure 51**) that featured silty soil inclusions. In order to confirm the absence of the remains of human practices, excavation continued at the 2x1 m western section of the pit, where materials continued to be absent up to 54 cm depth, when the excavation was closed without reaching Horizon R.

ELA2

Excavation unit ELA2 was a pilot unit for future excavations that involved the intervention of mounds since it was the only stratigraphic pit related to architectural remains excavated during 2015. The experience helped to develop the methods and techniques applied during the 2016 stratigraphic excavations (see Chapter 4). The unit was planned as a 2x2 m, only intervening within mound JA5 at its eastern section. For this reason, excavation was limited to the off-mound portions of the unit, leaving the mound untouched. However, as the profile of the mound was excavated, some on-mound stratigraphic units were observed and recorded. In total, four arbitrary metric levels of 10 cm each were excavated, and eight stratigraphic units were identified.

The soil profile was disturbed by the construction of the mound, so not all soil horizons were identified.

Figure 52: Photograph of La Aventura excavation unit 2 (ELA2) western (mound JA5) profile.

Figure 53: Photograph of La Aventura excavation unit 3 (ELA3) taken from the east.

Horizon A1 (I) was of a dark brown color, with a high content of organic matter, such as dry calabash tree fruits, roots, grass, and insects. Archaeological finds included ceramics and fragments of tile roof. Horizon A2 (III), of a reddish-brown color, contained lesser quantities of organic matter, only roots. Archaeological finds within this stratigraphic unit showed the highest densities within this pit, which could correspond with the construction use of the mound. Horizon AE (II), of a lighter brown color, shared very similar characteristics with the same stratigraphic unit excavated at ELA1 but yielded ceramics in lesser quantities. Horizon B (V) was compact and of a reddish-brown color, still contained decreasing quantities of ceramics, and was associated to the mound construction event. Horizon C (VI) was characterized by brown and reddish colors, composed of fragmented bedrock mixed with some clayish inclusions. Also, stratigraphic unit VI is a leveled, compact, and homogeneous layer throughout the excavation unit, and minimal ceramic sherds, as well as some possible tile roof fragments, were identified within it. The layer seems to constitute a leveling of Horizon C prior to the construction of the mound. The stratigraphic unit found below it (VII) consists of a clayish layer with the presence of charcoal and was archaeologically sterile.

The mound profile (**figure 52**) reveals some insights into construction practices. First, Horizon C (VI) appears to have been burned (VII) and excavated in order to provide a stable foundation for the structure. Then, stratigraphic unit V was placed on top of the modified VI—possibly for cementing purposes—and afterwards quarried bedrock blocks of rectangular shape (40x20x20 cm) were positioned vertically as an outer wall of the mound. These blocks were situated close to each other, also using V as a bond. The resulting wall served as a container for the mound's filling, comprised of sediment and smaller rocks (5-25 cm wide).

In contrast to the rest of the excavated sample both within the site and throughout the research area, this unit did not yield any lithic artifacts. Also, in comparison to excavation unit ELA1, it did not feature zooarchaeological remains. These characteristics are possibly related to both the function and chronology of mound construction and practices associated to its use, which will be discussed in Chapters 7 and 8.

ELA3

Five arbitrary metric levels of 10 cm each were excavated, and four stratigraphic units were characterized (**figure 53**). Horizon A1 (I) was dark brown, with high contents of organic matter such as roots, charcoal, grass, and seeds. Archaeologically, it yielded fragments of ceramics, chipped stone, ground stone (a *mano*), glass, roof tiles, metallic nails, and charcoal. Also, it contained the highest quantities of material culture throughout the unit, in contrast to the other two pits. Horizon A2 (III) was homogeneous throughout the site, so it featured the same characteristics as in excavation unit ELA2, with the presence of ceramic fragments. Horizon E

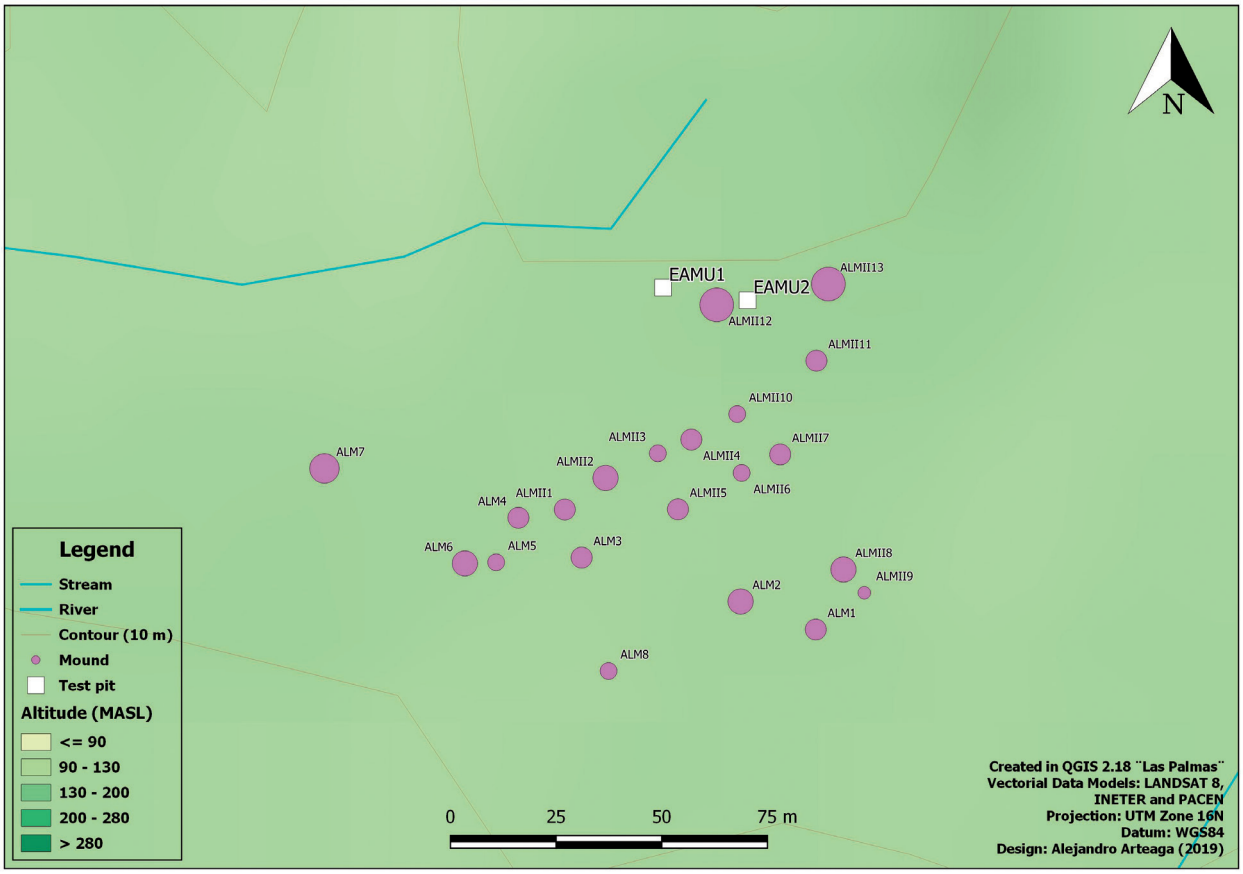


Figure 54: Alcides Montiel site plan featuring excavation units (credit: Alejandro Arteaga).

(VIII) was characterized by a lighter brown color and absence of archaeological finds. Horizon B (IX) showed high mineral and clay contents, which are characteristic within the illuviation zone. Since both VIII and IX were archaeologically sterile, excavations were interrupted before reaching Horizons C and R. This unit contained the lowest density of materials within the site; it lacked zooarchaeological finds, but it did feature the only sample of ground stone.

5.3.4 ALCIDES MONTIEL

Site description

The site coded as AM and AMII is owned by Don Alcides Montiel, spreads throughout two different lots, and is located directly east of the road leading to La Libertad, approximately 3.5 km northeast of Juigalpa. To the east, a 100 m slope connects the site with the Carca stream. Additionally, there is a stream northwest of the site less than 100 m away, which, according to satellite imaging, could have been an ancient arm of the stream. Nowadays, the land, which is covered in *lanilla* soil, is used for bovine cattle ranching. Vegetation is mainly comprised of grasses due to deforestation, but various tree varieties are found within the lots, such as *Chiquirín* (Myrospermum frutescens), *Guanacaste* (Enterolobium cyclocarpum), *Caraño* (Protium asperum), and *Níspero* (Mespilus germanica). Modern disturbances of the site are mainly due to the construction of the road, which cut at least one mound (AMII12) in half, as well as the houses constructed both west and east of the archaeological mounds. As a consequence of these disturbances to the site, it is difficult to assess the original site configuration.

The site is comprised of 21 man-made mounds, built on a soft slope, as well as some archaeological finds on the surface (**figure 54**). Half of the mounds are

shaped like half-moons, meaning that the circle of rocks that circumscribes the filling of the structure is actually a half-circle. This seems to be an adaptation of mound building practices to the topography, since the semi-circle of rocks is always oriented towards the lowest part of the mound, meaning that the slope upwards was possibly used as a containing wall. However, this feature could be related to the morphology of the structures above them, or even accesses to them. The rest of the mounds are circular in shape. Structures measured 528 cm diameter on average and 29 cm average height. However, there were two mounds that measured more than 900 cm in diameter and above 50 cm high (AMII12, and elevated foundation and AMII13, a platform). These larger mounds are also located on the highest portion of the site, and even though no clear site configuration was observed, there are two clear lines of mounds built down the slope and facing these larger mounds, together creating an open, elevated, and flat area.

Construction practices involved first the placement of a circle made up of medium sized rocks (quarried bedrock and/or river stones), mostly filled afterwards with sediment, sometimes mixed with rocks of the same types but of small to medium sizes, as well as possibly archaeological materials.

Less than 30% of the mounds featured surface finds, comprised of ceramics, chipped stone, and ground stone. These materials were only spotted in two sectors of the site: around the larger mounds described above (with medium and high densities) and following the natural slope to the southeast (in low densities). The first sector featured disturbances due to the road construction (AMII12) and bioturbations from a big tree (AMII13), which could explain the visibility of the finds. As this was a previously unrecorded site, no chronological hypotheses were available by the time the excavations took place, but some contamination was expected as the result of the construction of houses and the road in the vicinity.

Two excavation units were placed within the architectural portion of the site. EAM1 consisted of a 1x1 m pit taking advantage of the modern cut on mound AMII12. The main aim of this pit was to uncover the original mound profile to retrieve ceramics and obtain insights into construction practices. The second excavation unit, EAM2, consisted of a 2x2 m stratigraphic pit placed at the open flat and elevated area surrounded by the larger mounds. Since the latter was very shallow and only yielded two fragments of chipped stone, I will only briefly describe EAM1.

Figure 55: Alcides Montiel excavation unit 1 (EAM1) featuring a gap in the mound foundation possibly due to the presence of a post.

Stratigraphy at Alcides Montiel
EAM1

This excavation pit yielded seven different stratigraphic units and three interphases. Stratigraphic units I, IB, II, and IIA were related to the debris caused by the construction of the La Libertad road. At the bottom of II, a recent candy wrapper was found, confirming the suspicions that all stratigraphic units above this find were not primary contexts. Since the excavation unit was very small, stratigraphic assessment is limited. However, it is possible to determine that a combination of large bedrock fragments was used to build the foundation of the mound and to strengthen the structure of upper layers as well. These rocks were filled with sediment and smaller rocks (IV, V, VI, VII). At the proposed foundation (VIII, VIIIA, and VIIIB), a gap within the placement of the large rocks was identified, possibly suggesting the presence of a post at the center of the mound (**figure 55**). However, further excavations are needed in order to confirm or discard that hypothesis. Excavations were closed after several centimeters of an archaeologically sterile layer (IX).

5.3.5 BARILLAS

Site description

The site named Barillas is located in four different lots owned by Uriel Barillas, 250 m east of the Cuapa Road, and 100 m west of the Mayales river, on one of its meanders 5 km northwest of Juigalpa. The

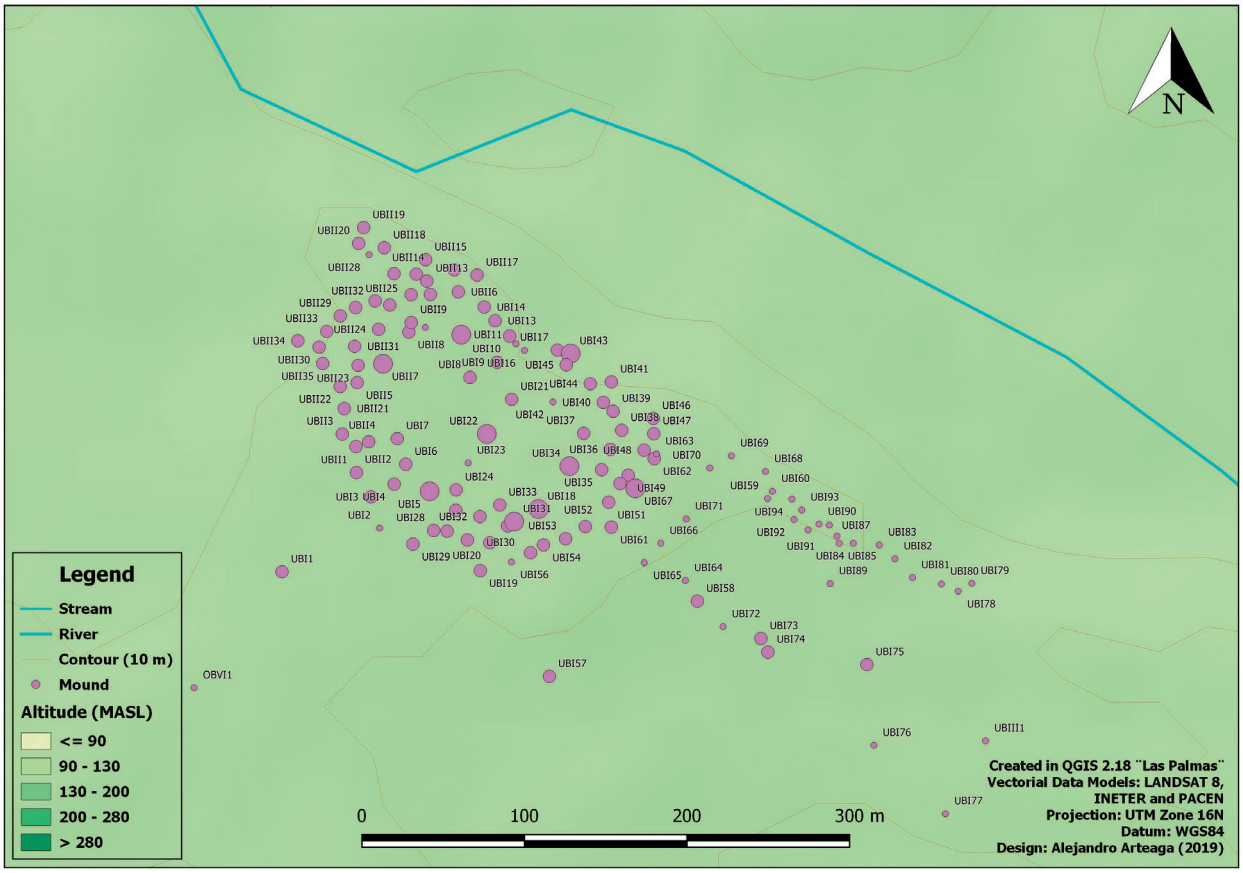


Figure 56: Map of the Barillas site (credit: Alejandro Arteaga).

site consists of 131 man-made mounds (**figure 56**) and material culture on the surface, distributed on a terrain characterized by soft rolling hills that lead to a steep cliff, which precedes the Mayales river. The archaeological site is situated on top of an alluvial terrace, which is also associated to branches of the river to the northwest and southeast. West of the site, the mild elevations are followed by the Amerrisque mountain foothills.

Surface soil is *lanilla* (alluvial soil/young volcanic ash) across the whole site, except for mound OBVI2, which is located to the west of the site, slightly isolated (80 m from the last mound), with *barrial* (tropical black soil) instead. Nowadays, the land is mainly used for cattle pasture; however, testimonies from locals indicate agricultural practices without the use of the plough as recent as 50 years ago, mainly dedicated to maize and beans. Therefore, the lots are mainly deforested and feature a variety of grasses. In spite of this, some trees are also found at the site, such as *Jícaro* (Crescentia cujete), *Guásimo* (Guazuma ulmifolia), *Cambrón* (Acacia pennatula), *Chiquirín* (Myrospermum frutescens), and *Higo* (Ficus cotinifolia), among other species. It is important to point out that the lots are divided by stone walls, so it is possible that the materials for constructing them could have originally belonged to some of the archaeological mounds. Also, two large pits were found on two of the main mounds. According to locals, those pits correspond to Richard Magnus' excavations in the 1970's. However, due to the lack of a published report on the site, it is impossible to assess if the pits correspond to archaeological excavations or looting.

Ancient man-made structures do not seem to follow a particular design; however, there is a clear clustering of mounds along the cliff. Apart from that, there is an alignment of structures along a hill located southeast

Figure 57: Mortars found on bedrock outcrops at Barillas varied in shapes: ovular (57a), rectangular (57b), and "D" shaped (57c).

of the site, with an orientation towards the northwest. Additionally, the mounds on the northern portion of the site seem to form a circular arrangement, which is divided in two, leaving two large flat open areas surrounded by mounds.

Mounds vary widely in shape and size; for example, diameter ranges span from 150 cm to 2150 cm, while average diameter is 650 cm and height is 45 cm. The 66 mounds exceeding this average diameter can be split into two groups. The first group includes 50 mounds between 650 cm and 1000 cm, with an average height of 50 cm. The second group is comprised of 16 larger mounds, with diameters larger than 1000 cm and an increase of average height to 75 cm. All of these larger mounds are located within the two open space configurations previously described. Additionally, 69% of the mounds are circular, 24% oval, 1% semi-circular, 1% half moon, 1% rectangular, and 4% with irregular shapes. Mound morphologies are extremely varied, with presence of elevated foundations (50.38%), circumscribed leveled elevations (4.58%), piles of rocks (6.10%), small piles of rocks (16%), stone wheels (3.05%), whereas 19.84% corresponded to irregular types.

Construction practices were variable, combining the regional tradition of using extracted bedrock, sediment, and fragments of archaeological materials with river stones as well as sand. Barillas was one of the two sites—along with La Aventura—that featured small pebbles, as part of the construction materials of the main plaza or patio mounds. Barillas features more surface materials than most other sites. Also, the mounds are larger than the rest of the sites examined. Even though sites like Lázaro Villegas might have more mounds (n=146), Barrillas features specific areas that could be interpreted as *plazas* or patios, with large mounds surrounding flat areas.

Apart from the architectural remains, archaeological materials found on the surface include fragments of ceramics, chipped stone, ground stone, a spiral-shaped petroglyph carved on a fragment of quarried bedrock, and a basalt column, as well as mortars that are ovular (30 to 40 cm diameter, **figure 57a**), rectangular (40x20 cm, **figure 57b**), and D-shaped (20x20 cm, **figure 57c**), carved into bedrock outcrops. These mortars were found associated to mounds located on the hill southeast of the site, as well as on the rocky slopes to the southeast, with no clear association to architecture. Ground stone fragments on the surface feature sporadic axe fragments, as well as stone grinding tools. Chipped stone finds on the surface included finished artifacts, flakes, and worked and unworked cores. Lastly, six different clay outcrops suitable for ceramic manufacture were identified within a 2 km radius from the site (Casale 2017; Casale *et al.* 2020).

According to Gorin (1990), who visited the site during his research project and also reviewed Magnus' notes on the site's ceramics, Barillas belongs to the Cuapa phase (1400 - 1600 CE). However, recent accelerator mass spectrometry (AMS) radiocarbon 14C dates (Donner & Geurds 2018) and re-evaluations of the Cuapa phase (Geurds 2013b; Donner *et al.* 2019) challenge its chronological position as well as the foundations for the phase itself (see Chapter 8).

Three different excavation units were placed at the site (**figure 58**). Unit 1 consisted of an approximation trench of 3x1 m south of mound UBI61, a circumscribed leveled elevation. The main aim of the pit was to diachronically study both the stratigraphy of the mound and its surroundings. Unit 2, on the other hand, consisted of a 2x2 m test pit located at a central spot in the southern "*plaza*", and its goal was to examine off-mound stratigraphy

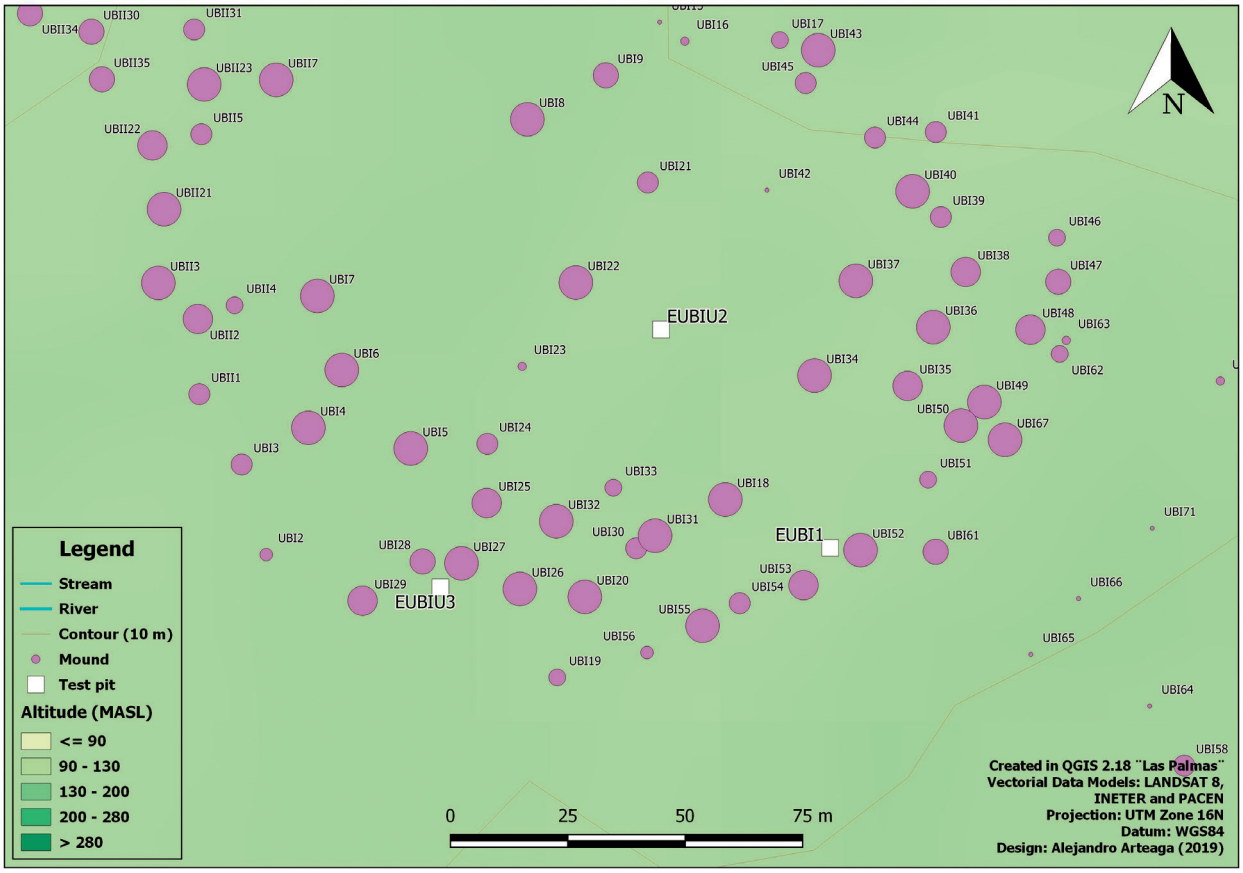


Figure 58: Close-up of Barillas with excavation units (credit: Alejandro Arteaga).

at the site. Last, Unit 3 was situated west of mound UBI27 and consisted of a 3x1 m trench approaching the structure, which was classified as a stone wheel. This mound was chosen for excavation due to its morphology and the abundance of materials on its surface.

Stratigraphy at Barillas

Excavations at Barillas were challenging due to four main reasons. To begin with, soil horizons had high contents of wet clay, so both excavation procedures and sieving required extra effort. Second, excavation units EUBI2 and EUBI3 were relatively deep when compared with the rest of the research area. In particular, EAUBI3 reached 140 cm in depth, resulting in the deepest excavation within this research. Third, preservation at the site seems to be problematic, as macrobotanical and zooarchaeological remains were completely lacking. Finally, since excavations were conducted during May and June, the team was subject to harsh climatic conditions: first the last strip of the dry season, with extremely dry weather and high temperatures, and then intense rainfall, which flooded the pits.

Stratigraphy at Barillas was characterized by a minimal Horizon O, resulting from contemporary pasture practices performed at the site. Horizon E was absent, possibly due to a lack of eluviation or leaching. Soil profiles at Barillas were characterized by several A Horizons due to continued human presence at the site and by very marked illuviated zones (Horizon B) featuring accumulation of clays and minerals. Horizon C was characterized by weathered parent material (tuff) mixed with clays rich in iron. Since two of the three stratigraphic units were excavated on-mound contexts, description will be approached separately.

Layer/Level Graph	XI1 (8-10 cm)	XI2 (10,10-20,00 cm)	XI3 (20,10-30,00 cm)	I4 (34,50-42,00 cm)	XI4 (30,00-39,80 cm)	XII4 (39,20-40,00 cm)
CER #	112,00	125,00	203,00	7,00	26,00	0,00
CER w	406,60	546,00	784,50	6,40	122,60	0,00
CS #	13,00	19,00	26,00	7,00	6,00	0,00
CS w	26,50	62,90	287,00	17,40	17,30	0,00
GS						

Layer/Level Graph	XIII4	I5 (40,10-42,00 cm)	IB5 (43,70-48,50 cm)	III5 (48,50-50,00 cm)	XII5	XIII5	III6 (50,10-53,50 cm)	Totals
CER #	48,00	0,00	426,00	35,00	57,00	103,00	167,00	1309,00
CER w	185,10	0,00	1645,20	215,40	202,20	614,60	538,60	5267,20
CS #	14,00	0,00	136,00	7,00	12,00	3,00	31,00	274,00
CS w	146,40	0,00	546,80	12,00	25,30	9,50	95,20	1246,30
GS			x					

Table 11: Distribution of materials collected from Barillas excavation unit 1 (EUBI1).

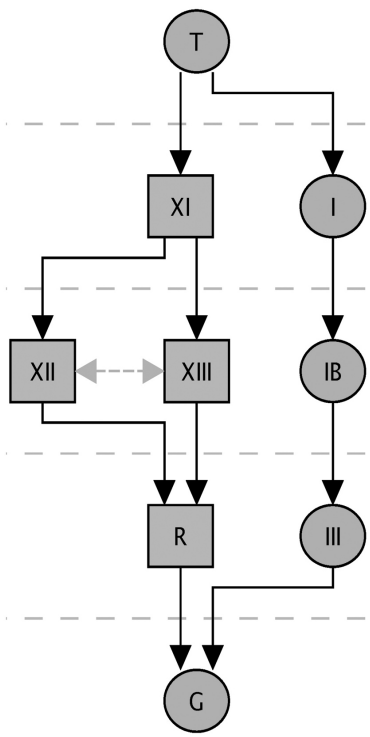


Figure 59: Harris matrix model for Barillas excavation unit 1 (EUBI1), based on the eastern profile of the pit.

UBI1

In this excavation unit, six arbitrary levels of 10 cm were excavated, as well as seven different stratigraphic units (**figure 59**). Four of these units were exclusively found within the mound (XI, XII, XIII, and R), and two were only retrieved off-mound (IB and III), while I was excavated both on- and off-mound.

Below the minimal Horizon O, Horizon A1 (I) was characterized by a grayish brown color and presence of organic matter such as grass roots. Archaeological materials, such as ceramics and chipped stone fragments, were present in very low quantities (see **table 11**). Horizon A2 (IB), also of a grayish brown color, did not contain any further organic matter but yielded the highest densities of archaeological finds within the excavation unit (ceramics, chipped stone, ground stone, and charcoal). This stratigraphic unit (IB) is interpreted as the core layer of mound use but might also contain some debris coming from the structure after its abandonment. Horizon A3 (III) contained horizontally placed ceramics, chipped stone, and minimal charcoal samples and was characterized by a brown soil matrix mixed with tuff inclusions, which belong to the weathered parent rock material. Below III, Horizon R was found, so excavations off-mound were stopped there. Apparently, Horizon R was leveled with III as either a floor that preceded the construction of the mound or for the construction of the structure, which took advantage of the bedrock's natural elevation to the south. Within the mound, quarried bedrock fragments of more than 30 cm (layer R) were placed in a circle on top of the edge of the bedrock elevation, before the start of the slope. Then, two different types of sediments (XII and XIII) were placed at the base of the mound, in its interior. Layer XII probably represents the highest densities of on-mound material culture, as well as additional structural stones. Charred organic remains were retrieved almost exclusively within the mound (XI, XII, and XIII), with only very small samples collected off-mound (IB and III). This might suggest burning practices associated to mound construction.

Figure 60: Photograph of Barillas excavation unit 2 (EUBI2) taken from the north.

UBI2

Six arbitrary metric levels of 10 cm each were excavated, as well as six stratigraphic units (**figure 60**). After the minimal Horizon O, Horizon A1 (I) was of a grayish brown color (*lanilla*), with high contents of organic matter, such as roots, herbs, insects, leaves, dry cow excrement, and seeds. Archaeological materials included ceramics and chipped stone fragments, as well as pieces of roof tiles. Horizon A2 (IA) also featured a grayish brown color and included organic matter such as grass, herbs, calabash fragments, insects, leaves, and cow excrement. In contrast to the previous stratigraphic unit, IA yielded ceramics and chipped stone positioned horizontally, and no tile roof fragments were recovered. Ground stone, river stones, and unworked chert were retrieved. This stratigraphic unit yielded the highest concentration of archaeological finds in the pit. Horizon AE (II), of a gray color, also contained material culture positioned horizontally (ceramic and chipped stone fragments) as well as river stones. Locals mentioned that this layer was comprised of pure *lanilla*, the preferred sediment for house building. Horizon Bt (IV, VI), of a dark brown color, was characterized by an increased clay content and the presence of archaeological materials such as ceramic, chipped stone, and ground stone. The clays found within these stratigraphic units were characterized by locals as a mixture of *lanilla* and *barro*, the latter suitable for ceramic production. IV also contained unworked chert and a black feather, possibly the product of contamination during the excavations.[63] VI consisted of a patch located in the middle of the North profile, with a lesser clay content than IV and with higher concentrations of river stones. Horizon C was a very dark grayish brown matrix with reddish yellow parent material inclusions, which seems richer in iron than in UBI1. This layer was archaeologically sterile, and floods caused by heavy rains resulted in the interruption of the excavation.

UBI3

In this excavation unit, 14 arbitrary levels of 10 cm each were excavated, as well as 18 different stratigraphic units (**figure 61**). Three stratigraphic units were exclusively found on-mound (XV, XVII, and XVI), and 13 were found off-mound (F1A, F1B, V, VII, VIII, VIIIA, VIIIF3, X, XIVE and XIVW, XA, C, and XIVA), while I and G were the only ones to be excavated both on-mound and off-mound. Since this excavation unit featured a lot of modification due to mound construction and daily practices, horizons cannot be applied. However, generally, Horizon O was minimal and was then followed by Horizon A (I), a dark grayish brown *lanilla* containing grass roots, ceramics, and tile roof fragments. Horizon B is clearly represented by XIV, a stratigraphic unit rich in clay and predating human practices. Horizon C (G) was characterized by a white/light gray soil matrix with high quantities of tuff inclusions. The rest of the stratigraphic units, since they were cultural, are considered various A Horizons.

All layers featured ceramic fragments, and stratigraphic units F1A, V, VIII, X, XIV (off-mound), XV and XVII (on-mound) also yielded chipped stone fragments. Layer XIV was the only one where a ground stone fragment was recovered. The excavation unit was located on the eastern section of Mound UBI27, and its stratigraphy shared some traits with EUBI1 but was different especially at the bottom off-mound layers. While Mound UBI27 was also built on top of a natural elevation, this was not composed of bedrock, but of a mix of residual and alluvial clays (XIV) that preceded the weathered parent material (G). Construction techniques involved the use of clay sediments (XV and XVII) mixed with debris

63 However, the presence of the feather elicited reactions from the local workers because the bird that it belongs to—locally known as the *tinco* (*Crotophaga sulcirostris*)—can be associated with witchcraft. In fact, locals believed that the feather was indeed ancient and that it preserved well due to its magical powers.

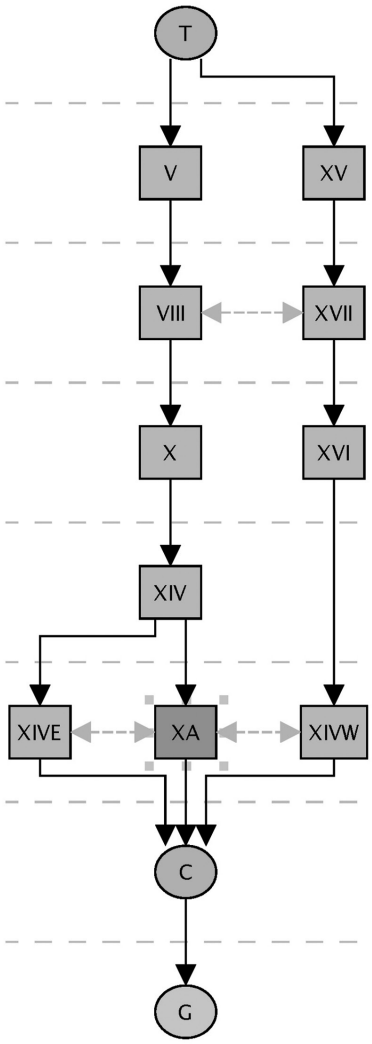


Figure 61: Harris matrix model for Barillas excavation unit 3 (EUBI3), based on the southern profile of the pit.

(ceramic and chipped stone fragments) and then compacted, possibly applied as a foundation for the structure. On top of these two layers, a wall, built using angular bedrock fragments larger than 20 cm (XVI), was placed to delimit the mound. A circle of rocks (F1A, F1B, and SVII) measuring 50x30 cm was excavated a few centimeters off the mound wall and was interpreted as either an access, hearth, or posthole trace.

Regarding off-mound stratigraphy, a collapsed posthole trace (XA and C, **figure 62**) measuring 36-

Figure 62: Photograph of Barillas excavation unit 3 (EUBI3), west profile featuring a posthole trace (credit: Matt Abtosway).

39 cm wide was located 80 cm west of the edge of the structure, directly on top of a geological stratigraphic unit, completely archaeologically sterile (G) and cutting through XIV (XIVE and XIVW). A leveling layer (X) was placed right on top of geological unit XIV and at the foot of the structure, probably indicating the age of the construction event. Then, XIV was followed by the layer with the densest material culture remains (VIII), possibly associated to mound practices. Layer V, which was the last off-mound stratigraphic unit below the topsoil (I), also featured material culture but in lower quantities than VIII, possibly due to post-occupation depositional processes. VIIIF3 consisted of an extension of the unit towards the west due to the recovery of a complete *olla*.

5.3.6 ROSA DOLORES OPORTA

Site description

A series of lots owned by Rosa Dolores Oporta is located approximately 5 km northeast of Juigalpa, 100 m north of the road to Los Cocos, and 300 m east of the La Libertad road. This archaeological site was constructed on an alluvial terrace with an irregular topography between two different streams: immediately east of the Carca stream and around 200 m west from the Las Tablas stream.

Currently, the lots feature *granza amarilla* soil (tropical iron rich alluvial soil), regarded locally as highly fertile and absent in the rest of the valley, as well as some bedrock outcrops. The land is mainly used for cattle ranching and agriculture without the use of the plough. The crops consist of wheat and

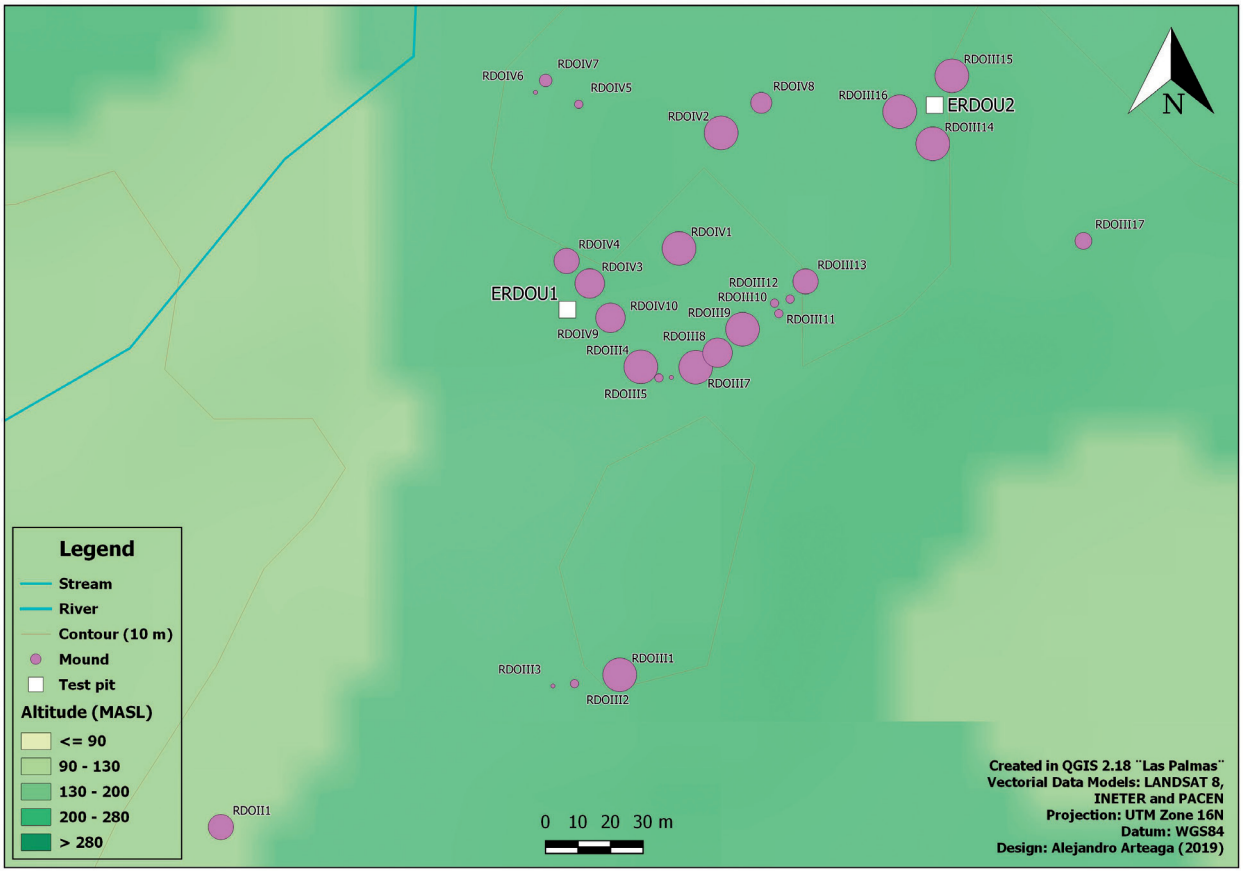


Figure 63: Rosa Dolores Oporta site plan featuring excavation units (credit: Alejandro Arteaga).

sorghum, used for human and animal consumption. Vegetation is mainly comprised of grasses, but trees are also found, such as Guilihuiste (*Karwinskia calderonii*), Mamón (*Melicoccus bijugatus*), Guásimo (*Guazuma ulmifolia*), and Jícaro (*Crescentia cujete* and *Crescentia alata*). No modern houses were built within the mounded area, but a few of them are found along the roads and the Carca.

The archaeological site is comprised of 28 man-made mounds and archaeological finds on the surface (**figure 63**). Architectural remains consist of circular, ovular, and half-moon shaped structures. Site configuration includes at least four different sections. First, there is a southern sector comprised of three mounds: a large one (RDOIII1, 1330 cm diameter, 65 cm height) along two smaller structures of less than 230 cm diameter. Second, a central area is comprised of 13 mounds (493 cm average diameter, 23 cm average height) placed on the slope of a hill forming a V shape, with a larger mound, RDOIV1 (1100 cm diameter, 42 cm height), at a central location on the upper and flat part of the elevation. This geometric configuration is oriented north, and one of the lines forming the V is oriented northeast, parallel to the Carca stream until it curves exactly where the mounds were built, while the other line forming the V is perpendicular to the Carca. The third mound cluster within the site is located northwest of the V configuration, and it is comprised of three small mounds (RDOIV5, RDOIV6, RDOIV7), measuring an average of 248 cm diameter and 15 cm high situated in close proximity. North of the V configuration, there are two mounds placed on the slope of the hill: structures RDOIV2 (945 cm diameter, 42 cm maximum height) and RDOIV8 (505 cm diameter, 16 cm high). Finally, three large mounds (1495 cm average diameter, 90 cm high) form a cluster at the flat northeast portion of the

	H	V	VA	VII	X	XI	XII	XV	XVII	Totals
CER #		7,00	18,00	2,00	5,00	17,00	17,00	26,00	8,00	100,00
CER w		54,40	135,60	2,60	33,80	141,00	110,90	235,80	119,40	833,50
CS #		13,00	1,00	4,00		4,00	8,00	7,00	9,00	46,00
OB		X								
BC		X	X		X		X	X	X	
AB					X			X		

Table 12: Distribution of materials collected from Rosa Dolores Oporta excavation unit 1 (ERDO1).

site, surrounding a flat open area. An isolated small mound (RDOIII17) is located 40 m southeast, within the same open plain.

The mound types identified are elevated foundations and small piles of rocks. For the elevated foundations, construction practices involved the placement of one or many circles of medium or large rocks as a first step (river stones in most cases, and also a combination of quarried bedrock and river stones), then filled with more rocks (of the same and/or smaller sizes), archaeological materials and sediment. On the higher parts of the site, Horizon R was used as a base for mound foundations, leveled with added sediment; while in the lowest and flat part of the site, construction took place apparently above Horizon B. Most of the mounds (82%) featured surface finds in low densities. While the southernmost cluster yielded roof tile fragments on RDOIII1, the rest of the material culture was comprised of ceramics, chipped stone, and ground stone. As this was a previously unrecorded site, no chronological hypotheses were available by the time the excavations took place, but suspicion about the contamination of pre-conquest contexts due to more recent construction activities was take into account, especially for the southern part of the site.

Two excavation units were placed on the site. ERDO1 consisted of a 2x1 m approximation trench south to mound RDOIV9, a half-moon shaped structure measuring 685 cm in diameter and 43 cm in maximum height. ERDO2 was a 2x2m stratigraphic pit located on the flat open area surrounded by large mounds, at the northeastern sector of the site.

Stratigraphy at RDO

Excavation Unit ERDO1

In this excavation, 12 arbitrary metric levels and 14 stratigraphic units (one found both on- and off-mound, six off-mound, and seven on-mound), as well as three interfaces formed by both bio and non bioturbations, were excavated in this pit (**figure 64**). Horizon O (H) was the only stratigraphic unit present in both mound and off-mound contexts, which consists of a very dark brown soil featuring the roots of grasses. No material culture was recovered within this unit (see **table 12**).

In the off-mound section of the excavation unit, stratigraphy continued with Horizon A1 (V), a dark brown layer with high organic content such as grass, roots, and insects. Apart from that, V contained small and medium sized rocks, ceramics, chipped stone, obsidian, and burnt clay. Charcoal was also recovered and is the result of recent burning of the land. Right underneath, Horizon AC (VA), of a dark brown color, had no organic matter, as well as medium to large sized rocks and tuff fragments. Ceramic densities increased, but only one fragment of chipped stone was recovered within this layer. Also, some sherds, especially the ones situated at the foot of the structure, were found in horizontal position. This stratigraphic unit seems to correspond with the surface in use simultaneous to the mound. Beneath VA, we located Horizon B1 (VII), of a dark reddish-brown color, with some organic content (roots), tuff inclusions, and minimal ceramics and chipped stone quantities. Towards the northwest (in the mound's direction), the profile shows a slope, so it is possible that a natural elevation on the bedrock and geological stratigraphic units on top of it were used as a foundation for mound construction. Below this layer, Horizon B2 (VIII), of a yellowish-red color, was excavated. This stratigraphic unit yielded no archaeological materials. Off-mound stratigraphy below VIII featured two layers on the same levels. On the one hand, the southwest section of the unit was characterized by Horizon B3 (IX) of olive brown color, right beneath VIII and archaeologically sterile. On the other hand, the east profile featured Horizon C1 (TC), a light gray tuffaceous layer with small and medium sized rocks.

Stratigraphy within the mound is complex due to the different geological stratigraphic units described above and the slope present on the west profile of the excavation unit but absent on the east profile.

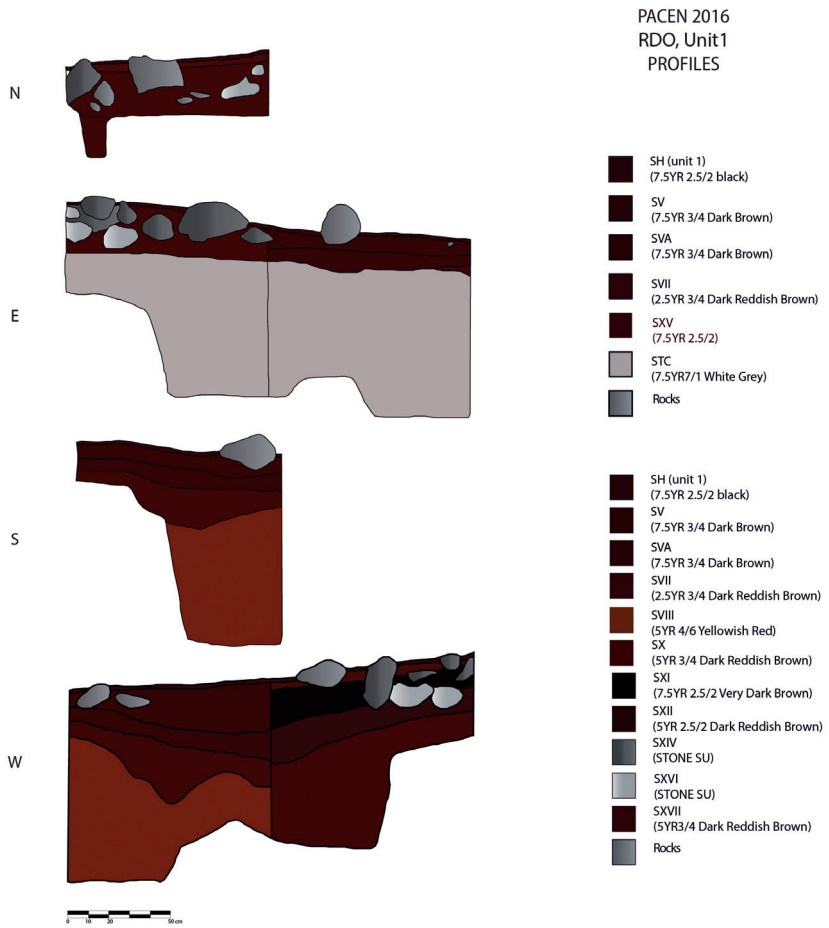


Figure 64: Profile drawing for Rosa Dolores Oporta excavation unit 1 (ERDO1).

Therefore, mound construction practices will be described separately according to the data recovered through the analysis of each profile and then integrated. On the east profile, building practices started taking advantage of a natural elevation of Horizon C(2) (TD), of yellowish brown color, with no archaeological materials and presence of medium sized rocks. Right on top of Horizon C2, we found Horizon A2 (XV), of a very dark brown color with organic matter (roots) and small fragments of tuff, as well as horizontally positioned ceramics, chipped stone, animal bone, burned clay, and charcoal. This layer, which has the highest density of material culture when compared to the rest of the stratigraphic units, served as infilling between the rocks that form the outer wall of mound RDOIV9 (XVI and XIV, see **figure 65**). The rocks that form XVI were placed first, in combination with XV, and then the rocks that comprise XIV were placed. Within XV, a feature that included ceramics, chipped stone, burnt clay, charcoal and animal remains (teeth) were found in the middle of the wall, with no indication of corresponding to later practices, but with the appearance of a hearth used during the construction process.

On the west profile, the mound was constructed on top of Horizon B4 (XVII), a dark reddish-brown layer with some organic matter (roots), tuff inclusions, ceramics, chipped stone, and burnt clay. Even though this stratigraphic unit is very similar to VII, it was named differently to separate off-mound and mound deposits and surfaces. Approximately half of the unit (the deepest 30 cm) was archaeologically sterile. On top of this layer (in the contact with XII), horizontal ceramics were recovered right below XVI. An

Figure 65: Photograph of Rosa Dolores Oporta excavation unit 1 (ERDO1), north profile, showing mound stratigraphy.

interface (XVII) was created for a soil with exactly the same characteristics but of a darker color (black). On top of XVII, Horizon A3 (XII and its interface XIIA) was very different from XV, located at the same level on the east profile of the excavation unit. XII also serves as the filling between the rocks that form the outer wall of the mound (XVI and XIV), is of a dark reddish-brown color, with some organic content (roots) and small and medium sized stones that apparently were used to consolidate the wall. The layer contained ceramics, chipped stone, and burnt clay. Interface XIIA consisted of a tree root. On top of XII, also serving as filling of the rocks forming the mound's wall (XIV, on the upper level, on top of XVI), was XI, Horizon A4. This layer featured a very dark brown color, grass roots, ceramics, chipped stone, and charcoal. According to one of the locals, this layer looked burnt due to its color and texture (*tierra Roja*). On top of this, we found X, Horizon A5, also associated to XIV. This stratigraphic unit contained low densities of ceramics but high contents of charcoal and burnt clay fragments, suggesting that the intentional burning of the filling sediments could be possible.

In general, mound stratigraphy suggests the use of natural elevations on Horizon C (TD) as foundations for structures, but also of Horizon B4 (XVII) when necessary. Sediments used as infilling were of the type available at the lot, with no indication of preference towards *lanilla* or other sediments not immediately available. The walls of the mound correspond to two different stratigraphic units (XIV and XVI), which

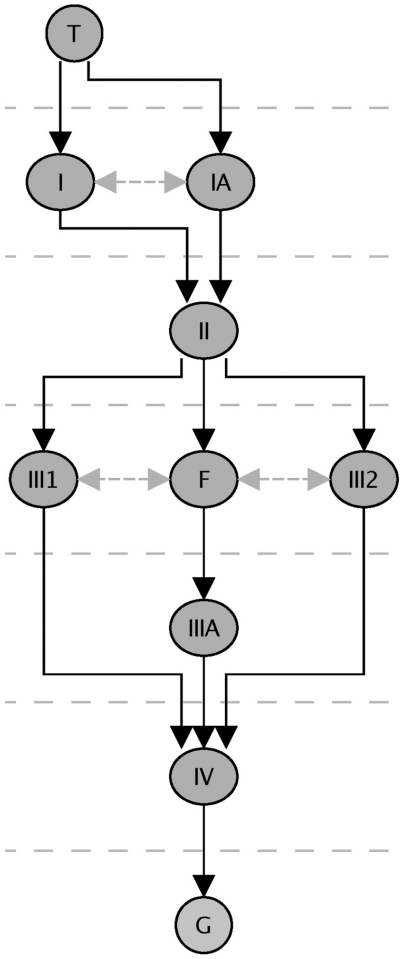


Figure 66: Harris matrix model for Rosa Dolores Oporta excavation unit 2 (ERDO2).

could mean that the construction took place in two different moments. The presence of the possible hearth within the mound and in association to XVI, the rocks positioned on the lowest levels and therefore first, could support that hypothesis. However, it is also possible that the hearth was in use during construction practices and does not necessarily imply two different moments with a larger time gap. Surface materials were scarce, so the function of the mound remains unclear.

Excavation Unit ERDO2

Seven arbitrary metric levels, six stratigraphic units, and four interfaces were excavated at ERDO2 (**figure 66**). Horizon O (H) was of a dark reddish-brown

Figure 67: Photograph of Rosa Dolores Oporta excavation unit 2 (ERDO2), SIIIA.

color and featured high contents of organic materials (mainly roots) and small rocks, as well as minimal amounts of ceramics and chipped stone. Horizon A1 (I), of a dark reddish-brown color, also yielded high organic content (roots—IA—and insects) and higher quantities of rocks than in H but with similar characteristics. The bulk of the archaeological materials within this excavation unit are found within this layer, both in the case of ceramics and chipped stone. Horizon A2 (II), consisted of a dark reddish-brown layer with high organic content (roots and insects), tuff inclusions, small rocks, ceramics, and charcoal. Horizon BC1 (III1 and III2) featured medium sized stones and was archaeologically sterile. However, an ancient cut through that stratigraphic unit, IIIA, was performed to place a complete vessel (F), which was found in a horizontal position with no other associated artifacts (**figure 67**). This cut is clear on the unit profiles, especially on the eastern one. Right underneath IIIA, two geologic stratigraphic units were identified: Horizon BC2 (IV), a yellowish brown "*tierra iguana*", and Horizon C (T, TA, TB, summarized as G), rich in tuffaceous inclusions of various colors.

Since excavations were not conducted in the mounds surrounding ERDO2, it is not possible to assess whether the placement and burial of the vessel is contemporaneous with the construction of the mounds or not. However, the stratigraphy strongly suggests that human practices related to the surfaces above (I and II) were later than the interment of the vessel.

5.3.7 OPORTA

Site description

The lot owned by the Oporta brothers is located on a plain at the foot of a curve of the Copelitos stream, a few meters north of its intersection with the Las Tablas stream. The archaeological site is situated approximately 5.5 km northeast of Juigalpa and less than 100 mts east of the La Libertad road.

The surface is covered by *tierra negra* (tropical black soil) and is nowadays used for cattle ranching. Vegetation is mainly comprised of grasses, but a variety of trees are found as well, such as Chiquirín (*Myrospermum frutescens*), Caoba (*Swietenia macrophylla*), Madero Negro (*Gliricidia sepium*), Guilihuiste (*Karwinskia calderoni*i), Cincho (*Lonchocarpus spp.*), Guásimo (*Guazuma ulmifolia*), Quebracho (Lysiloma auritum), and Espavel (*Anacardium excelsum*). No modern houses were built on the lot; however, the construction of the La Libertad road and the Camino a Los Cocos might have affected the conservation of the site.

The site consists of 33 man made mounds (**figure 68**), built right next to the Copelito stream, which bends at that point due to a geological fault (B. Acevedo, pers. comm. 2016). Architectural remains consist of circular (73%), oval (15%), and half-moon (12%) shapes. Mounds can be divided into two groups, roughly separated by a 30-meter gap of flat terrain. The northern cluster features a semi-circular arrangement comprised of nine mounds, measuring 660 cm diameter on average and with an average height of 32 cm. Structures surround a flat open area, and a triad of larger mounds (OP8 with 1575 cm diameter and 90 cm high, OP9 with 950 cm diameter and 29 cm high, as well as OP5 with 705 cm diameter and 38.5 cm high) is located on the western part of this arrangement, next to each other in a plaza-like configuration resembling the eastern cluster at RDO. The southeast cluster includes the remainder of the mounds, with no clear arrangement—except for a possible circular configuration at its northern top—which are placed throughout a flat area and across a small creek that separates three mounds (OP14, OP15, and OP16) from the rest. These mounds average 639 cm in diameter and 30 cm in height; however, ten of the 24 structures that comprise this section of the site exceed the average measurements, and mounds OP22, OP26, and OP27 stand out for their diameters exceeding 1000 cm.

Construction practices involved first the placement of a circle made up of mostly small to medium

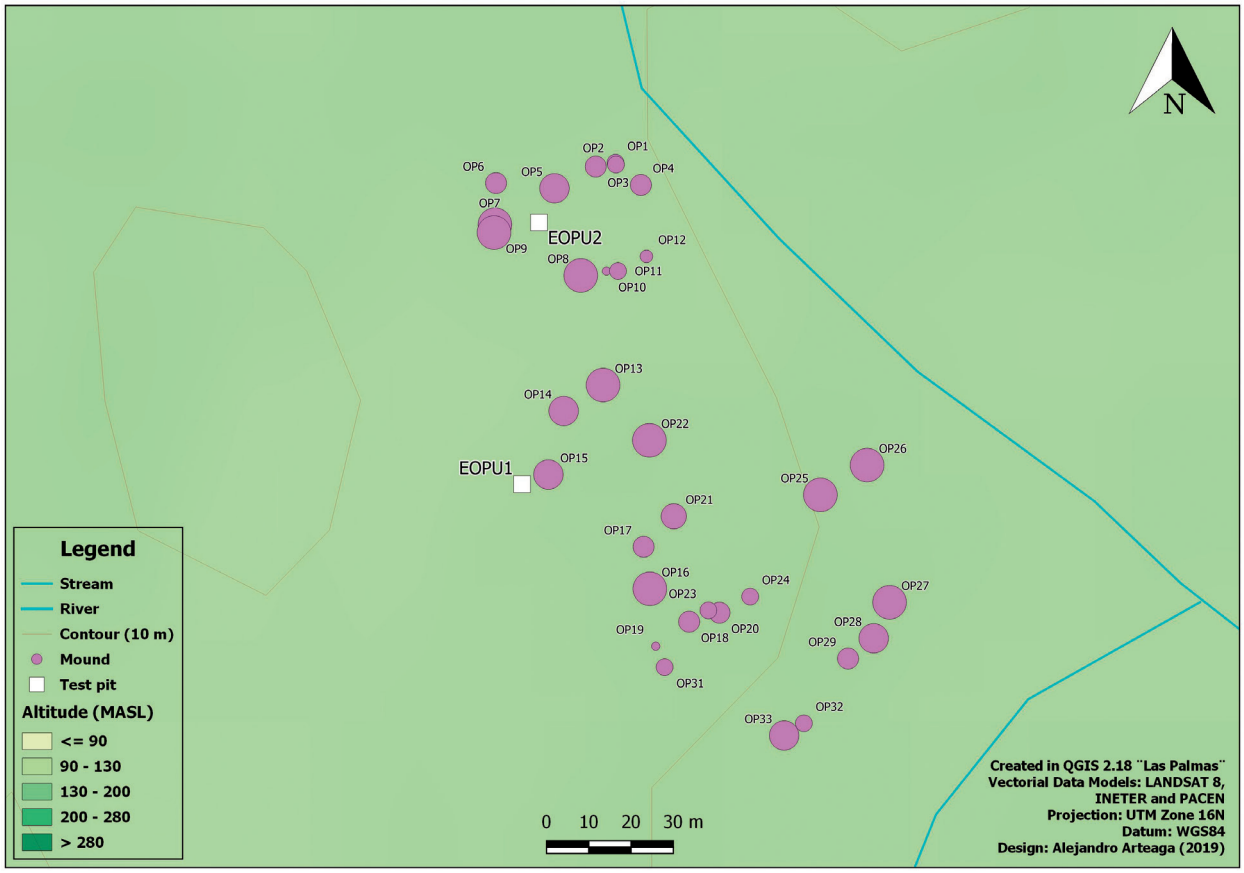


Figure 68: Map of Oporta archaeological site featuring excavation units (credit: Alejandro Arteaga).

sized rocks (all riverstones, except for one featuring quarried bedrock), filled afterwards with an assortment of rock fragments also of small and medium sizes and possibly archaeological materials. The site stood out during the survey due to the presence of some large mounds in contrast to the majority of lower and smaller structures, as well as some areas with visible surface materials in low, medium, and high densities. In fact, 82% of the mounds featured materials on their surface, which contrast with the majority of the sites studied in this research. Surface finds most commonly included ceramics, alongside chipped stone, a basalt column, and an obsidian fragment. As this was a previously unrecorded site, no chronological hypotheses were available by the time the excavations took place.

Two excavation units were planned and executed for this site (see **figure 68**). EOP1, a 2x1 m approximation trench, was placed on the west side of mound OP15, a medium-sized mound (820 cm diameter, 26 cm height) situated at the northernmost portion of the southeast cluster, within a circular arrangement of mounds. EOP2 was a 2x2 m stratigraphic pit located at the center of the northern cluster, almost equidistantly (circa 5 m) from the largest mounds (OP5, OP8, and OP9).

Stratigraphy at OP

EOP1

Seven arbitrary metric levels (3 to 9), fourteen stratigraphic units (four both off- and on-mound, three off-mound, and six on-mound) and several interfaces formed by both horizontal and vertical tree root (Papamiel, Chiriquín, Madero, Moranga, Cavazo, and Plomo) disturbances were excavated in this pit (**figure 69**). Horizon O (H) was the only stratigraphic unit present in both on-mound and off-mound contexts, which consists of a very dark brown

Figure 69: Harris matrix model for Oporta excavation unit 1 (EOP1), east profile (mound).

Figure 70: Stone circle (SIV) located next to the mound wall (stones visible at the bottom right angle of the picture).

alluvial soil deposit, possibly associated to the Carca stream. It featured grasses, as well as Papamiel and Carazo roots, insects, and small (<5 cm) and big (>15 cm) rocks; material culture was represented by a minimal presence of ceramics, chipped stone, and burnt clay (see **table 13**), which was denser on the subunit next to the mound, EOP1B. Layer H featured four different interfaces, which were interpreted as bioturbations caused by tree roots: HA, HB, HC, and HD, with no archaeological evidence except for HB, which had only minimal quantities.

In the off-mound section of the excavation unit, stratigraphy continued with a stratigraphic unit (IV) comprised of a stone circle found within levels 3 and 4, formed by rocks between 10 and 20 cm in size and in different shapes (round, oval, and angular) (**figure 70**). As in Barillas (EUBI3), the stone circle was located right next to the visible surface of the mound, but once the excavation continued, it was revealed that the sloping wall of the mound extended slightly underneath this circle, so IV is later than the mound wall. In turn, this could correspond with a posthole trace as in EUBI3, but in spite of the similarities, no clear trace of a posthole was identified, so its interpretation remains unclear. The stone circle could have served many different purposes, such as

	1	2	3	4	5	6	7	8	9	Totals
CER #	0,00	64,00	51,00	242,00	217,00	55,00	2,00	0,00	0,00	631,00
CER w	0,00	267,80	260,80	1573,80	1413,10	212,00	12,50	0,00	0,00	3740,00
CS #	0,00	52,00	40,00	232,00	235,00	69,00	2,00	0,00	0,00	630,00
CS w	0,00	104,00	117,40	757,90	882,10	67,00	0,80	0,00	0,00	1929,20
GS		X		X						
OB		X		X	X	X				
BC		X	X	X	X	X	X			
AB		X			X					

Table 13: Distribution of materials collected from Oporta excavation unit 1 (EOP1).

for leveling the floor, an access, or a hearth—though no charcoal was recovered—or to hold a sculpture, for example. A distinction was made between the soil within the stone circle (II) and outside of it (III).

Horizon A1 (II) consisted of a dark reddish-brown color with rocks (small, medium, and large) and featured two tree root interfaces (IIA and IIB). Material culture in II included ceramics, chipped stone, and burnt clay. Interface IIA also yielded obsidian fragments, but due to the vertical movement of bioturbation, these finds could correspond with other layers. Horizon A2 (III), the stratigraphic unit situated off the stone circle, was of a dark reddish-brown color and included medium sized rocks, as well as an interface (IIIA), also formed by a tree root. III yielded ceramics—some in horizontal position—and chipped stone in comparable quantities to II; obsidian, shell and burnt clay were present as well. Additionally, ground stone and zooarchaeological remains were also collected within this layer. The bulk of archaeological materials within this excavation unit was recovered in these last two stratigraphic units (II and III). Right below, Horizon A3 (VII), a very dark brown burnt surface with small and medium rocks, featuring interface VIIA (root), was found. This stratigraphic unit consisted of mostly burnt clay and was found both on- and off-mound (named VIIM for the mound portion). Since some fragments of fired clay evince architectural characteristics, such as log marks in the "interior" surface and a flat area on the "outer" surface, together with the fact that the bulk of the material culture within this unit is either in the stratigraphic units above this one (32% of the materials) or within the mound as a filling (50%), it is possible that layer VII corresponds with the burning of a previous structure. After cleaning the surface soil at the time (X?), a fire was set, and the remaining debris was used as a foundation for both the construction of the mound and the floor surface. Therefore, materials within the mound and below VII should be earlier than those recovered on the off-mound stratigraphic units above VII. Horizon AB (X) was excavated right below VII; this layer was of a dark reddish-brown color and contained small and medium river stones (including river pebbles and tuff), as well as ceramic sherds, chipped stone, obsidian, and burnt clay. This stratigraphic unit was also identified beneath VIIM on the mound section of the excavation unit but was named XM. Below X, Horizon BC (XIV), a dark reddish-brown stratigraphic unit featuring river stones of medium and large sizes, as well as tuff fragments, was archaeologically sterile; this unit was also found underneath the mound (XIVM) and could suggest flooding episodes before the construction of the first structure. Also, we may hypothesize that possible subsequent floodings might have been involved in decisions connected to building the second mound; it is probable that these types of episodes might have required a higher mound and floor level, for example. Stratigraphy within the mound is very different from the off-mound portion of the excavation unit, except for Horizon O (H) on the surface and Horizons A3 (VIIM), AB (XM), and BC (XIVM). The rest of the stratigraphic units, all cultural surfaces and deposits, were therefore classified as different A Horizons. Horizon A4 was comprised of stratigraphic units XII, XV, XVI, and XVII. Layer XII, of a very dark grayish brown color, with roots and angular and subangular stones of small, medium, and large sizes; consisted of the sediment filling the lower levels of the sloping wall. The stones placed to form the wall at this level were classified as XVII. Material culture within XII consisted of obsidian, burnt clay, and zooarchaeological remains. Root interfaces, XIIA, XIIB, XIIB, XIIC, and XIID (same as HA, HB, HC, and HD but in a lower level), were created to assess bioturbations caused by tree roots. The upper level

of stones forming the mound wall (XVI) was filled with a very dark grayish brown layer (XV). This layer contained rocks of all sizes, as well as minimal quantities of ceramic and chipped stone. Horizon A5 was comprised of two stratigraphic units. First, XIX was found right underneath the previously described layers and consisted of a dark brown stratigraphic unit with very similar characteristics to XII and XV. However, the sediment here was mixed with small stones instead of big stones forming a wall, as on the levels above. Material culture recovered in XIX consisted of ceramic and chipped stone in low quantities, as well as obsidian and burnt clay fragments. Second, XX, of a dark reddish-brown color and similar small stones, featured ceramics, chipped stone, and burnt clay. Cutting across these two stratigraphic units, we excavated Horizon A7 (XVIIM), the burnt portion of VII that was found within the mound. This unit featured small angular stones, ceramic, chipped stone, obsidian, burnt clay, and zooarchaeological remains. A horizontal root disturbing this unit, VIIMA, was identified. Horizon A8 (XXI), a reddish-black thin layer with no rocks, was found immediately below VIIM. Since XXI was exclusively found on the sections below VIIM, it was probably placed before the burning event. Material culture unearthed within this stratigraphic unit consisted of ceramic, chipped stone, and burnt clay. An interface (XXIA, which is a continuation of XVIIA and XVIIMA) included ceramic finds only and consisted of disturbances caused by a tree root. Immediately below, Horizon AB (XM), a dark brown layer featuring subangular small stones, was excavated. Archaeological finds within this unit consisted of ceramic, chipped stone, obsidian and burnt clay. Interface XMA (a continuation of VIIA, VIIMA, and XXIA) was related to a horizontal tree root disturbance. Finally, Horizon BC (XIVM), of a dark reddish-brown layer containing rocks of all sizes, was—as was its off-mound counterpart XIV—archaeologically sterile.

To summarize, practices that took place before the construction of the mound (X and XIV for the off-mound portions, XM and XIVM for the on-mound section) are divided from the ones associated to the mound construction by VII (and VIIM), which is the apparently intentionally burnt layer. The presence of river pebbles in the layers and levels underneath this burnt surface, in contrast to their virtual absence on top of it, could mean that the surface prior to the mound suffered from flooding from the Carca stream. Presence of archaeological materials in both X and XM and their absence in XIV and XIVM could support this hypothesis. Additionally, burning surfaces can turn a soil hydrophobic, preventing water filtrations. Aside from a functional explanation, burning a previous structure can entail several meanings and respond to different practices, so all possibilities need to be taken into account.

Figure 71: Photograph of Oporta excavation unit 1 (EOP1) featuring a mound profile (east wall, opposing the scale) that shows leveled stratigraphic units and the perpendicular wall (south) with a sloping stratigraphy.

Even though mound layers are leveled (**figure 71**), the west profile wall of the excavation unit features a slope with a south-north orientation. It is unclear if this corresponds with a natural elevation of XIV or an intentional excavation of this natural layer for drainage purposes. Either way, this possible excavation took place before the mound construction, because X is deposited on top of it. These practices performed prior to the construction of mound OP15 are reflected in X and XM. A structure was possibly burnt to create a foundation (XX, XXI, VII, and VIIM) for both the mound and its surrounding area. Then, the surface was leveled with XIX before placing the stones and filling that would form the mound's wall (XII, XV, XVI, and XVII). The surfaces located off-mound and on top of the burning event are possibly associated with practices from when OP15 was in use.

EOP2

Six arbitrary metric levels and nine stratigraphic units were unearthed in this excavation unit. Additionally, 13 interfaces corresponding with horizontal and

vertical tree roots (Papamiel, Caobo, and Chiriquín) were identified (**figure 72**). Horizon O (H) was the only layer that was present in both EOP1 and EOP2. It was of a grayish-brown color and featured numerous tree and grass roots, as well as rocks of all sizes (including river pebbles), chipped stone, ceramics, and burnt clay.

Horizon A1 (I) was dark brown due to its high organic contents, which were mainly comprised of roots (interfaces IA, IB, IC, ID, IE, IF, IG, IH/K, IL). This stratigraphic unit included medium-sized stones, ceramic, chipped stone, a ground stone fragment (at interface IE), and burnt clay. Horizon A2 (V) was of a dark grayish-brown color and featured high organic contents—mainly roots. This layer was characterized by the presence of small and medium sized rocks (including river pebbles and tuff fragments), as well as ceramics found in horizontal position. The amount of rocks was high (>100), and V is the core archaeological stratigraphic unit, with 53.37% of the ceramics. Also, it contained large amounts of chipped stone and burnt clay fragments. The combination of the large amount of rocks with the position of the finds indicate that this surface was a walking space, possibly related to the mounds surrounding the open area where the excavation unit was placed. Below this dense layer, Horizon A3 (VI), of a dark brown color, was excavated. The tree roots continued to be present, and we recovered small stones (including a few river pebbles and tuff fragments), ceramics, chipped stone, obsidian, burnt clay, and charcoal. Ceramic density dropped dramatically when compared to the previous stratigraphic unit (V). There is also a decrease in chipped stone but not as pronounced as that of the ceramics; while ceramics decreased 93.38%, chipped stone was reduced 63.46%. Two interfaces were created for VI (VIA and VIB) due to tree roots. Below this stratigraphic unit, we dug Horizon A4 (VIII), which was of a dark brown color with higher iron input due to the continued presence of tree roots. Additionally, the layer yielded small and medium sized stones (including river pebbles and tuff fragments), ceramics, chipped stone, obsidian, burnt clay, and zooarchaeological remains. Ceramic quantities increased 86.13%, whereas chipped stone remained almost equal to the previous layer (n=38 for VI and n=44 for VIII). Right underneath this unit, Horizon AB (IX), of a dusky red color, was found. The presence of tree roots started to decrease, and high quantities of small and medium sized stones (including small river pebbles and tuff) were unearthed. Material culture

Figure 72: Photograph of Oporta excavation unit 2 (EOP2), west profile.

was comprised of horizontally positioned ceramics, as well as fragments of chipped stone and burnt clay. Two interfaces (IXA and IXB) were created as a result of Caoba roots disturbing the unit. Even though the amount of material culture decreased when compared to the stratigraphic unit above (VIII), the position of the finds suggests that this layer consisted of a surface where people and/animals walked. Right beneath it, we excavated Horizon B (XI), of a very dark grayish brown, containing roots and small, medium, and large rocks (including small river pebbles). Material culture was minimal, with a presence of ceramics, chipped stone, zooarchaeological remains, and charcoal samples. This stratigraphic unit looks extremely similar to a layer observed on the stream profile a few meters away from the excavation unit, which shows a violent episode involving transport of large rocks. Therefore, this layer was interpreted as a flooding event that either took place before consistent human presence at this site or washed away any previous presence, as material culture is minimal and could be the result of contact with the stratigraphic unit above, IX. The soil horizon excavated below, BC1 (XIII), was of a very dark brown color due to the presence of roots. Apart from that, it contained high quantities of small and medium sized stones as well as tuff inclusions and was concluded to be archaeologically sterile. This unit was also interpreted as a result of flooding from the Carca stream, but with less strength than in XI. Apart from that, this layer is extremely similar to XIV at excavation unit EOP1; however, the frequency of rock inclusions at XIII (EOP2) is 60% in

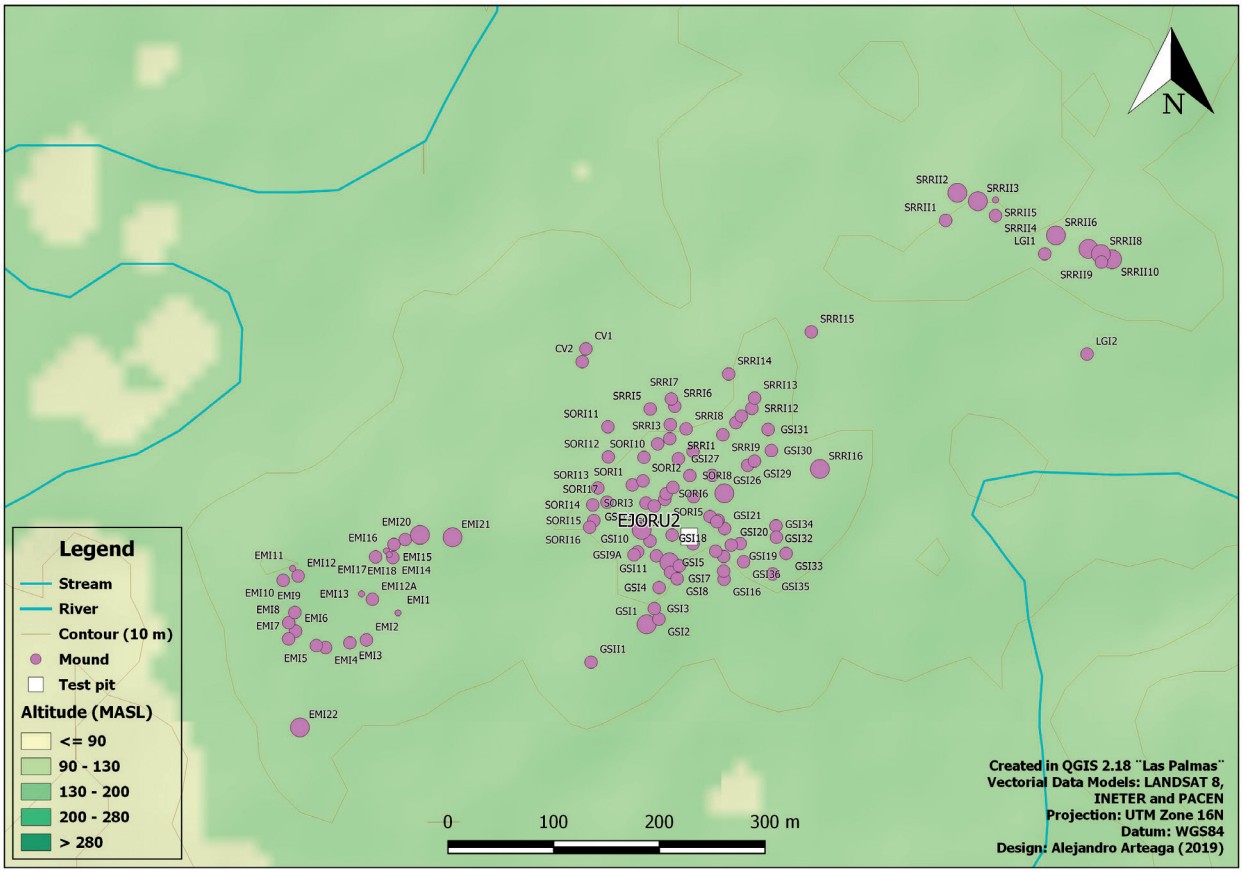


Figure 73: Map of Josefa Ocón Robleto (Piedras Grandes II) archaeological site featuring excavation units (credit: Alejandro Arteaga).

relationship to the soil matrix, while in XIV (EOP1) it is 30-40%. One explanation for this discrepancy could be the fact that EOP2 is located much closer to the shores of the Carca, facilitating transport and deposit. Finally, Horizon BC2 (XVIII), of a dark brown color, containing very small pebbles and tuff inclusions (all rounded), was again archaeologically sterile. This stratigraphic unit was interpreted as another flooding event, the least violent of the three positively identified.

In summary, EOP2 possibly consisted of a floor surface located among larger mounds, which were constructed after an episode in which the Carca stream suffered from progressive—and maybe seasonal—growth (XVIII, XIII, and XI). The first floor corresponds mainly with IX, but also with VIII, and was possibly disrupted by smaller flooding episodes (VIII and VI). The second floor surface is V, which also represents the densest cultural layer. Afterwards, the site was probably abandoned.

5.3.8 JOSEFA OCÓN ROBLETO

Site description

The lot owned by Josefa Ocón Robleto is located on a soft slope north of the intersection between the Manigua and Carca streams, 2.5 km northeast of Juigalpa, approximately 1 km east of La Libertad road (**figure 73**). The site is cut by a dirt road and spreads through the lots owned by Edy Molina, Socorro Robleto, César Báez, and Luisa Galeano. This archaeological site is comprised of 108 man-made mounds, was named Piedras Grandes II, and is part of the Sabana Grande cluster, located southeast of the research area (Arteaga 2017). The site was divided by Arteaga in three different mound clusters: the northeast, central, and southeast groups (Arteaga

2017, 307). Since the site is extensive and excavations only took place in the central cluster, I will describe in detail the portion excavated, while a description of the whole site can be found in Arteaga's thesis (2017, 306-311).

The surface soil is *lanilla*, and it is covered by grasses and a variety of local trees. Land use is mainly related to cattle ranching, though agriculture is also practiced. Several modern houses were built within the lots that contain mounds, as well as three roads that have caused disturbances in the architectural remains.

The central cluster of the site is comprised of 73 mounds of circular (90%), ovular (7%), and half-moon (3%) shapes. Average mound measurements are 437 cm in diameter and 28 cm in height. However, due to the large number of mounds, Arteaga's subdivision of mounds is followed, which groups them as large (>100 cm diameter),[64] medium (between 590 and 100 cm diameter), and small (<590 cm diameter). In total, there are nine large mounds, which average 1147.5 cm diameter and 435.5 cm in height; 56 medium sized structures, with 722.5 cm average diameter and 25 cm height; and eight small mounds, with an average diameter of 460.5 cm and 19 cm height. No clear site design is recognizable, but open flat areas surrounded by and between mounds are visible throughout the lots. Construction practices involved first the placement of a circle made up of medium to large sized rocks (river stones or quarried bedrock), filled afterwards with medium sized rock fragments and possibly archaeological materials. Excavations on mounds were not conducted at this site, so observations regarding building materials and techniques are based on surface recordings.

Archaeological surface finds were present on 34% of the mounds within this central cluster, and they appeared in low to medium densities. Surface materials included ceramics, chipped stone, and ground stone. It is important to mention that fragments of carved sculpture were found within the northern cluster, while a basalt column was identified in the southern group of mounds (Arteaga 2017, 307). However, these types of artifacts were not present within the excavated section, the central cluster.

One test pit was excavated for this site (EJOR2), consisting of a 2x2 m situated in the flat terrain between mounds GSI14 and GSI15. The context excavated at JOR2 differs slightly from the other 2x2 m undertaken in the rest of the sites because it was placed right between two mounds and not on flat open terrain surrounded by structures, such as in OP1 or UBI2, for example. Therefore, some differences between the practices inferred at JOR2 and those identified at contemporaneous sites could be related to a contextual bias.

64 Mounds within this category are the following: GSI1, GSI13, GSI26, GSI5, SORI14, SORI15, SRRI1, SRRI15, and SRRI16.

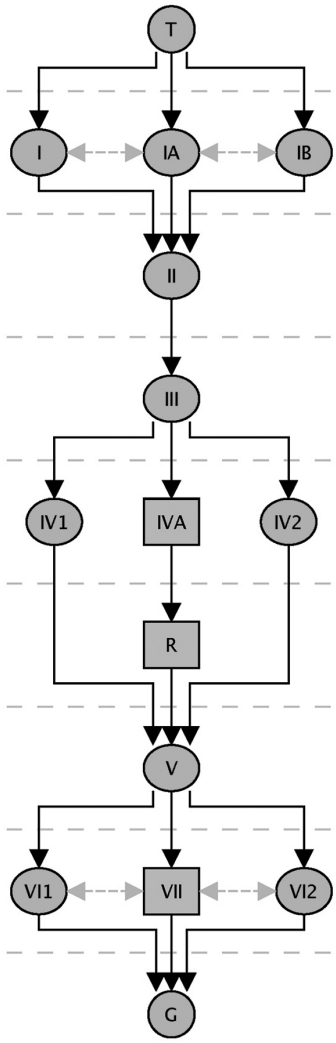


Figure 74: Harris matrix model for Josefa Ocón Robleto excavation unit 2 (EJOR2).

Stratigraphy at JOR

JOR2

Nine arbitrary metric levels of 10 cm each were excavated, as well as 12 stratigraphic units (**figure 74**). After the minimal Horizon O, Horizon A1

	H (37,00-40,00 cm)	I (40,10-46,10 cm)	IA (41,50-43,00 cm)	IB (45,00-46,00 cm)	II (46,10-56,80 cm)	III (56,8-60 cm)
CER #	1,00	102,00	0,00	0,00	273,00	194,00
CER w	18,40	643,62	0,00	0,00	3488,70	1195,00
CS #	2,00	11,00	0,00	0,00	50,00	72,00
CS w	1,60	11,70	0,00	0,00	194,40	165,70
GS						
BC		X			X	X

	IV (48,30-56,80 cm)	IVA (56,80-?? cm)	V (55,60-66,80 cm)	VI (66,80-84,70 cm)	VII (84,70-91,90 cm)	II (91,90-116,60 cm	Totals
CER #	51,00	54,00	151,00	173,00	75,00	0,00	1074,00
CER w	573,60	727,10	2482,10	1705,80	623,10	0,00	11457,42
CS #	12,00	34,00	89,00	66,00	27,00	0,00	363,00
CS w	6,00	71,60	167,00	118,50	183,90	0,00	920,40
GS				X			
BC	X	X	X	X	X		

Table 14: Distribution of materials collected from Josefa Ocón Robleto excavation unit 2 (EJOR2).

Figure 75: Photograph of Josefa Ocón Robleto excavation unit 2 (EJOR2) showing SIV and SIVA, a possible hearth feature.

(H) was of a dark brown color (*lanilla*), with high contents of organic matter, such as grass roots and charcoal fragments possibly resulting from periodic burning related to modern agricultural practices. Archaeological materials included only a few chipped stone fragments and one ceramic sherd (see **table 14**). Horizon A2 (I) featured a grayish-brown color and organic matter such as grass and tree roots, insects, and charcoal. This stratigraphic unit, I, yielded ceramics, chipped stone, and burnt clay; tuff fragments and charcoal were also retrieved. IA was interpreted as an interphase of I, was of a grayish-brown color, and featured grass roots but no archaeological materials. It possibly resulted from the decomposition of a tree root. IB, another interphase of I, was similar to IA but much more compact, of a dark gray-brown color, and featured no organic matter or archaeological materials. Horizon A3 (II), of a dark brown color, contained Chiriquín roots and insects, as well as <5 cm rock fragments. Archaeological materials were extremely abundant (for ceramics, 30% of the total retrieved in the excavation unit), consisting of horizontally positioned sherds, chipped stone and burnt clay fragments. A clay ball and a fragment of

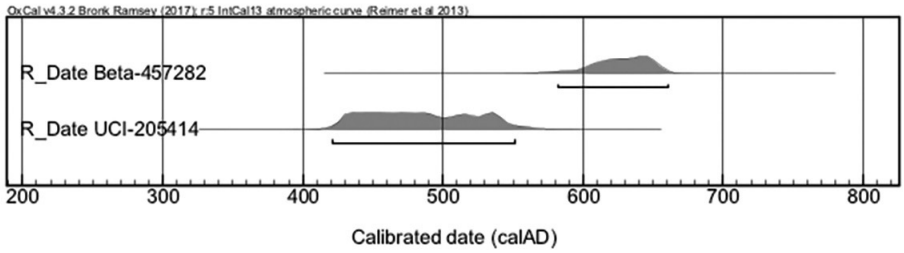


Figure 76: Multiple plot featuring the non-contaminated AMS dates for Aguas Buenas.

a seal were unearthed within this stratigraphic unit. Due to the characteristics of the stratigraphic unit, it was interpreted as a floor level. Horizon AE1 (III), of a grayish-brown color, still contained some roots and subangular 5-15 cm rock fragments. Archaeological materials included ceramics in decreasing densities, chipped stone, and burnt clay. Within the same level (6), Horizon AE2 (IV and its interphase IVA) consisted of a feature located in the south of the unit, of a dark brown color and angular rocks of more than 15 cm in size, which yielded small fragments of charcoal, as well as ceramics, chipped stone, and burnt clay fragments (**figure 75**).

Due to the characteristics of the layer, it was interpreted by the excavators as a hearth. Therefore, a sample from this horizon (JOR2IVA7) was sent to Beta Analytics for absolute dating. However, the 18.6 mg of material contained almost no carbon and appeared to be mineral matter instead. According to the lab specialist, the sample could correspond with material with high manganese content (D. Hood, pers. comm. 2017). Since manganese is an effective fire starter (Heyes *et al.* 2016; Sørensen *et al.* 2018), the hearth hypothesis could be accurate. Immediately below, Horizon AB1 (V), of a very dark brown color with the presence of rocks smaller than 15 cm, featured horizontal ceramics both in the beginning and end of the layer, as well as chipped stone and burnt clay fragments. Like III, this stratigraphic unit was interpreted as a floor level; therefore, feature IV (which includes interphase IVA) would have been first associated to V (and possibly VI), and later to II. Horizon AB2 (VI), of a dark reddish-brown color, showed some bioturbations caused by Chiriquín and Papamiel roots. This stratigraphic unit yielded ceramics, chipped stone, ground stone, and burnt clay fragments. A feature (VII) was contemporaneous to VI and was the first stratigraphic unit that had higher clay contents; rather than being classified as *lanilla* (alluvial soil), it was identified by local residents as red clay. VII consisted of a clay spot with some rocks with traces of burning activities. Finally, Horizon BC (VIII) consisted of a brown sterile stratigraphic unit with tuff fragments.

5.4 RADIOCARBON DATES

In total, 28 samples were sent to three different labs to obtain accelerator mass spectrometry (AMS) radiocarbon 14C ages. These samples consisted of charcoal fragments (n=14), charred seeds (n=1), zooarchaeological remains (n=3), organic sediment (n=8), and charred residues on sherd (n=2). The dated samples were retrieved from eleven different archaeological sites: Aguas Buenas, Alcides Montiel, Oporta, Rosa Dolores Oporta, Roberto Amador, Barillas, Josefa Ocón Robleto, Sabana Grande, La Aventura, Sebastián Ríos Histórico, and Lázaro Villegas. Calibrations were run through OxCal v4.3.2.2 (Bronk Ramsey 2017) using the IntCal13 curve (Reimer *et al.* 2013) and CalPal online employing the CalPal_2007_HULU curve, Bomb13NH2 Curve (Bomb13NH2.14c), and post-bomb atmospheric NH2 curve (Hua *et al.* 2013). Results are summarized in **table 15** and described below.

Samples dated from Aguas Buenas were excavated from excavation units EAB1, EAB3, EAB4, and M177. Of the four samples dated, only two yielded viable results (**figure 76**). Sample Beta-457282 was procured by taking advantage of a cut made to mound M177, located in the *Outer Arches* sector, as a result of road construction work. An organic sediment sample was collected using the technique described in Donner and Geurds (2018). Dates using OxCal v4.3.2 were between cal 582 and 661 CE with 95.4% probability (a span of 79 years), while Online CalPal yielded cal 622 ± 20 CE. Sample Beta-443735

Lab No	Lab	Site	Excavation Unit	Layer	Depth (cm)	Material	14C Dates BP	δ13C (‰)
Beta 457282	Beta Analytics	Aguas Buenas	177 (mound)	N/A	N/A	organic sediment	1420 ±30	-17.9
Beta 443735	Beta Analytics	Aguas Buenas	1	II	20-30	charcoal	4780 ±30	-27.2
Beta 457266	Beta Analytics	Alcides Montiel	1	VII	60-70	charcoal	1260 ±30	-25.4
Beta 457280	Beta Analytics	Oporta	1B	XIX, XX, VIIM, XXI	40-50	organic sediment	920 ±30	-18.5
Beta 457274	Beta Analytics	Oporta	1A	X	40-50	charcoal	940 ±30	-25.7
Beta 443733	Beta Analytics	Rosa Dolores Oporta	2	IIIA	30-40	organic sediment	570 ±30	-12.8
Beta 457277	Beta Analytics	Rosa Dolores Oporta	1B	X	20-30	charcoal	210 ±30	-25.6
Beta 457268	Beta Analytics	Rosa Dolores Oporta	1B	XV	30-40	charcoal	110 ±30	-24.8
Beta 457281	Beta Analytics	Roberto Amador	RAI25 (mound)	N/A	N/A	organic sediment	1010 ±30	-18.5
Beta 457270	Beta Analytics	Roberto Amador	1	V	40-50	charcoal	1020 ±30	-25.3
Beta 457276	Beta Analytics	Barillas	3	XF2	130-140	organic sediment	730 ±30	-13.6
Beta 443734	Beta Analytics	Barillas	1C	XII	40-60	organic sediment	670 ±30	-14.7
Beta 457279	Beta Analytics	Josefa Ocón Robleto	2	IV	50-60	organic sediment	990 ±30	-15.9
Beta 457273	Beta Analytics	Sabana Grande	1A	VI	30-40	charcoal	870 ±30	-8.6
Beta 457278	Beta Analytics	Sabana Grande	1	XVII	50-60	organic sediment	870 ±30	-19.8
Beta 457272	Beta Analytics	Sabana Grande	1A	XV	50-60	charcoal	1020 ±40	-25.7
Beta 457275	Beta Analytics	Sabana Grande	2	XII	40-50	charcoal	120 ±30	-24.6
UCI-198121	University of California, Irvine	Rosa Dolores Oporta	1B	XV	30-40	animal bone	160 ±15	-9.3
UCI-198122	University of California, Irvine	La Aventura	1	II	20-30	animal bone	145 ±15	-8.5
UCI-198123	University of California, Irvine	Sebastian Rios Historico	1	IIA	20-30	animal bone	100 ±15	-21.7
Poz-96201	Poznan Radiocarbon Laboratory	Lazaro Villegas	1	II	oct-20	charred seed	-556 ±26	N/A
UCI-205413	University of California, Irvine	Alberto Obando	1	III	20-30	charred residue on sherd	1645 ±25	N/A
UCI-205414	University of California, Irvine	Aguas Buenas	3	III	20-30	charred residue on sherd	1565 ±25	N/A
UCI-205415	University of California, Irvine	Aguas Buenas	4	II	oct-20	charcoal	145 ±25	N/A
UCI-205416	University of California, Irvine	Oporta	1A	III	30-40	charcoal	175 ±25	N/A
UCI-205417	University of California, Irvine	Barillas	1B	IB	40-50	charcoal	4240 ±280	N/A
UCI-205436	University of California, Irvine	Josefa Ocón Robleto	2	VII	70-80	charcoal	5285 ±20	N/A
UCI-205437	University of California, Irvine	Barillas	1B	III	40-50	charcoal	1795 ±15	N/A

Table 15: Radiocarbon assays analyzed through AMS for dating.

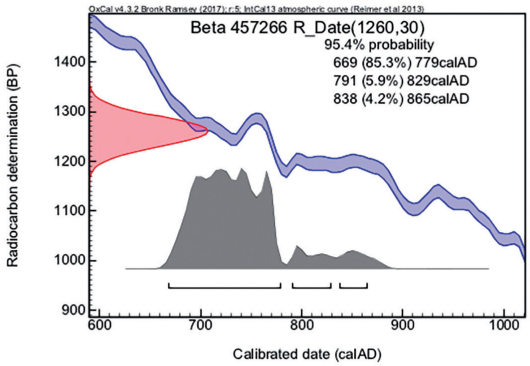


Figure 77: Single plot for sample Beta-45726, retrieved from Alcides Montiel.

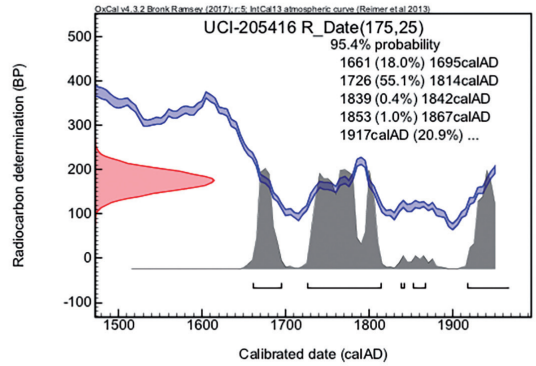


Figure 78: Multiple plot featuring the non-contaminated AMS dates for Oporta.

consisted of a charcoal fragment recovered from unit EAB1, stratigraphic unit II, arbitrary level 3 (20-30 cm below surface). This pit, which was excavated in the *Eastern Cluster* of the site, dated between cal 3641 and 3519 BCE with 95.4% probability (a span of 122 years) using OxCal v4.3.2 and cal 3583 ± 42 BCE with Online CalPal. Results were interpreted as contaminated tree remains located near the bedrock (Donner & Geurds 2018). UCI-205414 consisted of a sherd featuring charred residues, which was retrieved from excavation unit EAB3 at layer III, level 3 (20-30 cm), situated at the south section of the *Empty Area* (Donner & Geurds 2020). The sample yielded a date between cal 421 and 551 CE (a span of 130 years), with 95.4% probability in OxCal v4.3.2 and cal 485 ± 41 CE in Online CalPal. The last dated sample from Aguas Buenas, UCI-205415, consisted of a charcoal fragment extracted from excavation unit EAB4, stratigraphic unit II, level 2, positioned at the *Empty Area* near the largest mound of the site (M272). Results dated between cal 1668 and 1946 CE with 95.4% probability (span of 278 years) using OxCal v4.3.2 and cal 1813 ± 106 CE through Online CalPal. Therefore, the sample was interpreted as charred organic materials from contemporary burning practices (Donner & Geurds 2020).

A single sample, found in association to three ceramic sherds, was dated for the site Alcides Montiel (**figure 77**). Beta-457266, a charcoal fragment, was collected at excavation unit EAM1, so it is associated to mound AMII12. The date, which corresponded to layer VII and level 7, yielded dates between cal 669 and 865 CE (a 196 year span) using OxCal v4.3.2 with 95.4% probability, and cal 734 ± 38 CE through Online CalPal.

Three samples were dated from the Oporta site, of which two yielded suitable results (**figure 78**). Beta-457280 consisted of organic sediment excavated from unit EOP1B, associated to mound OP15, layers XIX, XX, VIIM, and XXI level 5, so it is connected to mound construction practices. Dates obtained ranged between cal 1028 and 1184 CE (a span of 156 years) with OxCal v4.3.2 with 95.4% probability and cal 1099 ± 47 CE with Online CalPal. Beta-457274 was retrieved off-mound from excavation unit EOP1A, stratigraphic unit X level 5. Results were between cal 1025 and 1160 CE (a span of 135 years) with OxCal v4.3.2, 95.4% probability and cal 1090 ± 46 CE with Online CalPal. Sample UCI-205416 was retrieved from excavation unit EOP1A, stratigraphic unit III level 4, consisted of a charcoal fragment which dated between cal 1661 and 1917 CE (a span of 256 years) with 95.4% probability through OxCal v4.3.2 and cal 1802 ± 123 CE with Online CalPal, so it was interpreted as a recent contamination (Donner & Geurds 2020).

For the site of Rosa Dolores Oporta, four different samples were run, of which one was not contaminated (**figure 79**). Sample Beta-443733 consisted of organic sediment from excavation unit ERDO2, stratigraphic unit IIIA (associated to a complete vessel), levels 4 and 5, at least 10 cm below the core cultural layers, and with virtually sterile stratigraphy in between (only 6.44% of the ceramic materials were found there). This complete vessel was apparently placed and buried before the use of the space, which has been characterized as a plaza configured by three large mounds with a flat area in between, where the excavation unit was placed. Results were between

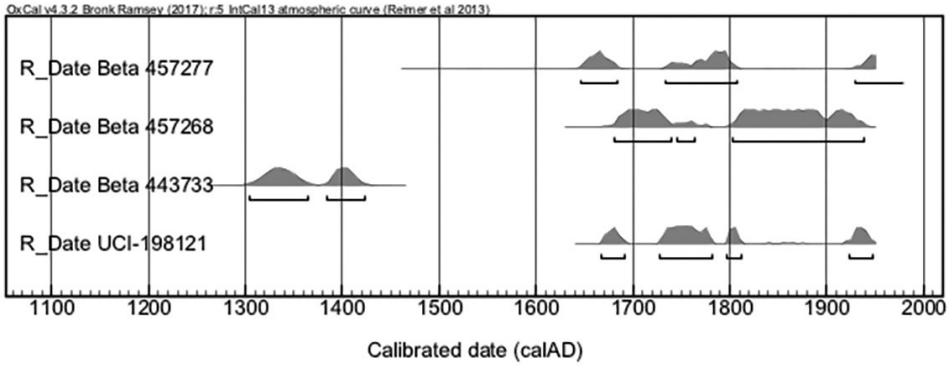


Figure 79: Multiple plot showing the four samples analyzed through AMS for Rosa Dolores Oporta.

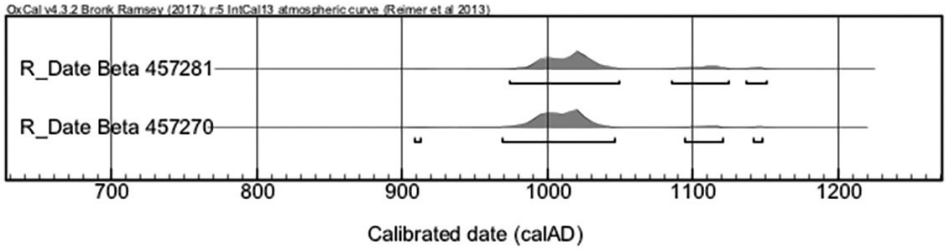


Figure 80: Multiple plot with samples dated for Roberto Amador.

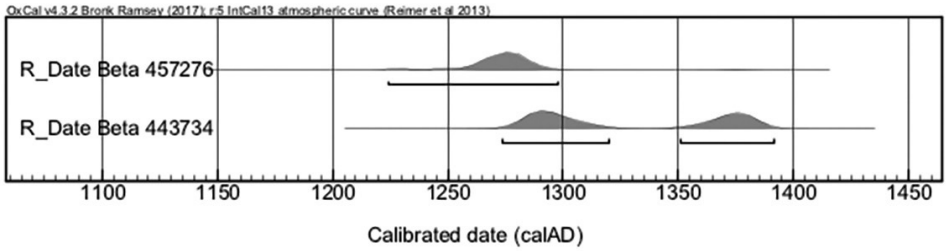


Figure 81: Multiple plot featuring the non-contaminated AMS dates for Barillas.

cal 1295 and 1433 CE (a span of 138 years) with 99.7% probability using OxCal v4.3.2 and cal 1360 ± 40 CE through Online CalPal. Beta-457277 was comprised of a charcoal fragment from excavation unit ERDO1B, stratigraphic unit X level 3, associated between cal 1528 and 1916 CE (a span of 388 years) with 99.7% probability using OxCal v4.3.2 and cal 1729 ± 69 CE through Online CalPal. Beta 457268, a charcoal fragment, was retrieved in excavation unit ERDO1B, layer XV level 4 and yielded dates between cal 1699 and 1945 CE (a span of 246 years) with 99.7% probability through OxCal v4.3.2 and cal 1808 ± 97 CE through Online CalPal. UCI-198121 consisted of a faunal bone excavated from ERDO1B stratigraphic unit XV level 4. Dates obtained were between cal 1665 and 1916 CE (a span of 251 years) with 99.7% probability through OxCal v4.3.2 and cal 1806 ± 121 CE through Online CalPal.

At the Roberto Amador site, two different samples were dated (**figure 80**). Beta-457281 consisted of an

organic sediment sample recovered taking advantage of a cut made for construction purposes on mound RAI25. The sample yielded dates between cal 973 and 1150 CE with 95.4% probability (a span of 177 years) through OxCal v4.3.2 and cal 1013 ± 17 CE with Online CalPal. Sample Beta-457270 was a charcoal fragment obtained at ERAI1, stratigraphic unit VII, level 5, which dated between cal 909 and 1147 CE (a span of 238 years) with 95.4% probability through OxCal v4.3.2 and cal 1006 ± 16 CE with Online CalPal.

From the Barillas site, four samples were selected for absolute dating, of which two yielded non-contaminated results (**figure 81**). Sample Beta-457276 consisted of organic sediment obtained at excavation unit EUBI3B, stratigraphic unit XF2, 50 cm below surface, at the foot of mound UBI27. Dates obtained were between cal 1224 and 1298 CE (a span of 74 years) with 95.4% probability on OxCal v4.3.2 and cal 1268 ± 12 CE with Online CalPal. Sample Beta-443734 consisted of organic sediment excavated at EUBI1C, at the foundation of mound UBI61 (stratigraphic unit XII, between levels 5 and 6). Results were between cal 1274 and 1391 CE (a span of 117 years) with 95.4% probability on OxCal v4.3.2 and cal 1329 ± 44 CE with Online CalPal. UCI-205417 was comprised of charcoal fragments excavated at the foot of mound UBI61, from EUBI1B stratigraphic unit IB, level 5. This sample dated between cal 3634 and 2138 BCE (a span of 1496 years) with 95.4% probability on OxCal v4.3.2 and cal 2862 ± 391 BCE with Online CalPal. Therefore, it was interpreted as a contamination resulting from the deposition of older charred organic materials in the context of a shallow horizon associated to bedrock. UCI-205437 consisted of a charcoal fragment found in excavation unit EUBI1B, stratigraphic unit III level 5. This sample yielded dates between cal 137 and 320 CE (a span of 183 years) with 95.4% and cal 209 ± 30 CE with Online CalPal. These last two samples were taken from the same metric level and were both considered contaminated (Donner & Geurds 2020).

For the Josefa Ocón Robleto site, two different samples were dated, but only one yielded non-contaminated results (**figure 82**). Beta-457279 consisted of organic sediment retrieved from excavation unit EJOR2, layer IV level 6. Results indicated that the sample dated between cal 989 and 1153 CE (a span of 164 years) with 95.4% probability through OxCal v4.3.2 and cal 1059 ± 47

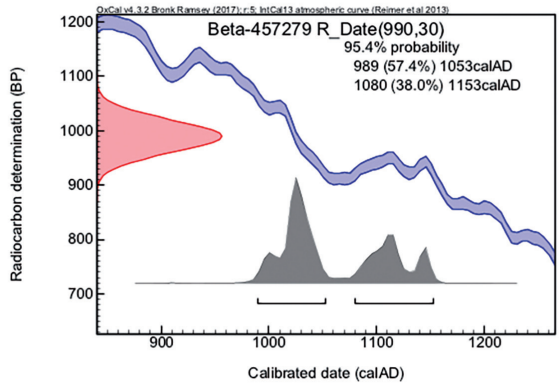


Figure 82: Single plot featuring the non-contaminated dated sample for Josefa Ocón Robleto.

CE with Online CalPal. Sample UCI-205436 was a charcoal fragment retrieved at JOR2, stratigraphic unit VII level 8, which yielded an age between cal 4231 and 4005 BCE (a span of 226 years) with 95.4% probability through OxCal v4.3.2 and cal 4138 ± 72 BCE with Online CalPal.

At the Sabana Grande site, four samples were run for absolute dating, of which one was contaminated (**figure 83**). Beta-457273 was comprised of charcoal fragments collected from excavation unit LD1A, layer VI level 4. Results placed the samples between cal 1045 and 1250 CE (a span of 205 years) with 95.4% probability at OxCal v4.3.2 and cal 1139 ± 61 CE through Online CalPal. Beta-457278, an organic sediment sample retrieved from ELD1, layer VII level 6, dated between cal 1045 and 1250 CE (a span of 205 years) with 95.4% probability at OxCal v4.3.2 and cal 1139 ± 61 CE through Online CalPal. Beta-457272 consisted of a charcoal fragment collected from ELD1A, layer XV level 6. The sample was dated between cal 900 and 1152 CE (a span of 252 years) with 95.4% probability at OxCal v4.3.2 and cal 1012 ± 31 CE through Online CalPal. Beta-457275 was a charcoal fragment excavated at ELD2, layer XII level 5 whose age was estimated between cal 1679 and 1940 CE (a span of 261 years) with 95.4% probability through OxCal v4.3.2 and cal 1809 ± 98 CE through Online CalPal.

For the remaining four archaeological sites that were dated through AMS, only one sample was suitable for determining age. In the case of sample UCI-198122, a faunal bone excavated from ELA1 (**figure 84**), stratigraphic unit ll level 3, results indicated

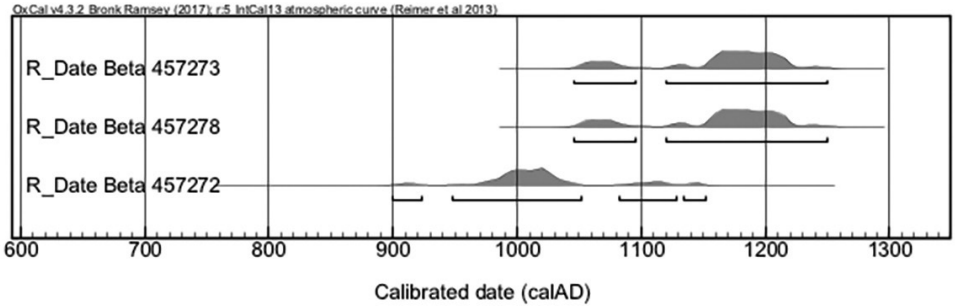


Figure 83: Multiple plot featuring the non-contaminated AMS dates for Sabana Grande.

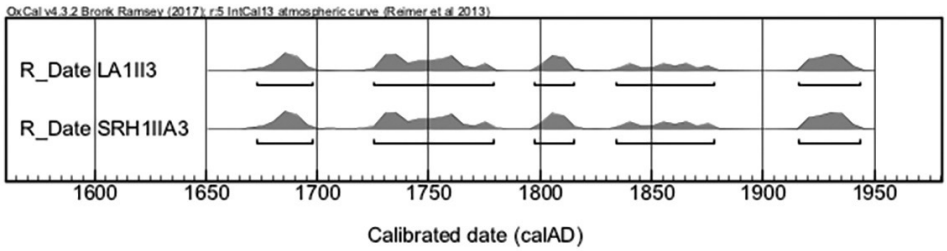


Figure 84: Multiple plot showing samples dated from La Aventura and Sebastian Ríos Histórico.

a range between cal 1673 and 1943 CE (a span of 270 years) with 95.4% probability at OxCal v4.3.2 and cal 1812 ± 112 CE with Online CalPal. Sample UCI-198123, another faunal remain but excavated at ESRH1 (**figure 84**), layer SllA level 3, was dated between cal 1692 and 1920 CE (a span of 228 years) with 95.4% probability OxCal v4.3.2 and cal 1803 ± 93 CE with Online CalPal.

Poz-96201 consisted of a charred seed excavated at ELV1, layer II level 2. This sample yielded contaminated results. Sample UCI-205413, a sherd fragment with charred residue collected at EAO1, stratigraphic unit III level 3, dated between cal 337 and 530 CE (a span of 193 years) with 95.4% probability OxCal v4.3.2 and cal 399 ± 22 CE with Online CalPal (**figure 85**).

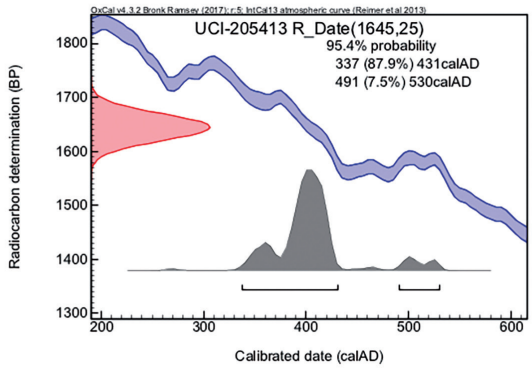


Figure 85: Single plot featuring the AMS date for Alberto Obando.

6 Laboratory methods and techniques for ceramic analysis

As stated in previous chapters, this project's laboratory work focused on the various itineraries of ceramic manufacturing practices, with the objective of outlining the trajectories of technological steps in the different sites selected for examination. Particularly, analysis concentrated on the physical, mechanical, and thermal properties of pottery, which not only provide information on production techniques, but also on pottery use and the nature of raw materials (Rice 2005). Therefore, ceramic description and analysis are seen as parts of one whole, in which each feature is understood in relationship to the others. Physical properties are complex to understand, since they "(...) are directly affected by materials and by the potter's techniques, [but] also the nature of the material often limits the choice of technique, and both material and technique in turn influence style" (Shepard 1985, 95) Thus, raw materials, manufacturing techniques, and style are all part of social universes of practices that are intertwined and co-relate to each other.[65]

To try to encompass this complexity, the laboratory analysis methodology applied in this study was comprised of five main steps to produce sufficient data in order to evidence the various choices made by communities of potters. In Chapter 8, these technological decisions will be spatiotemporally contextualized.

In general, examination of ceramic sherds was conducted in two stages: "(...) visual and archaeometric (scientific—comprising petrological, compositional and materials-science techniques), reflecting a rising level of complexity (and cost), but decreasing accessibility and a consequent narrowing of the quantity of material that may be processed" (Orton & Hughes 2013, 153). Consequently, traditional characterization methods were merged with archaeometry, challenging and complementing technological studies with mineralogical characterization through thin section petrography. Even though a geochemical approach using portable X-Ray Fluorescence (p-XRF) was also designed for this research, and more than 200 sherds were measured, time constraints prevented the integration of those results into this book. Consequently, they will be published later as a separate article.

As a result, relatively simple procedures were complemented with specialized techniques with the goal of measuring and describing ceramics under precise and reproducible standards (Rice 2005). To fulfill this, various macroscopic and microscopic strategies were applied to the collection, which involved different levels of sampling that will be explained in each section of this chapter.

In order to reconstruct the ancient ceramic manufacturing practices within the research area, the five steps of my method can be summarized as follows:

1. ***Macrofabric classification***: following Rye (1981), Shepard (1985), Sinopoli (1991), Rice (2005), the general procedures and outlines by the Prehistoric Ceramics Research Group (PCRG 2010), Orton and Hughes (2013), and Roux (2016), ceramics were classified according to the macroscopic properties of their paste. During this part of the analysis, the main objective was to achieve a preliminary paste composition characterization, as well as a general overview of firing techniques and vessel shapes.
2. ***Macrotrace analysis***: within the previously sorted macrofabric groups, an adapted version of V. Roux (2016) and S. Manem's (2008) methodology was applied for the identification of macroscopic technological traces. This stage of the analysis mainly focused on the following steps of the *chaîne opératoire*: fashioning, pre-forming, finishing, surface treatment, and decoration.

65 See Chapter 3 for a complete theoretical discussion.

Figure 86: Storage of materials at the project house in Juigalpa (credit: Arnau Llaudet).

3. ***Techno-petrographic groups***: based on the results of the two steps above, the outlines proposed by I. Whitbread (1986), P. Quinn (2013), P. Degryse and D. Braekmans (2017) were applied for mineralogical characterization under the polarizing light microscope. This section of the analysis provided insight on choices related to clay procurement and paste preparation techniques.
4. ***Morphostylistic groups***: based on the combination of all the analyses described above, a small sample was selected for shape and decoration classification, to outline the end products related to the different operational sequences identified in this study (Roux 2016).
5. ***Production sequences:*** through the combination of all the analytical steps outlined above, different ceramic manufacturing sequences were created for each site, from clay procurement practices through firing, decoration techniques and the end products.

Finally, the different methods used to assess the chronological span of this study will be described. A combination of different materials (charcoal, organic sediment, charred residues encrusted on sherds, animal bone, and a burnt seed) were run for Accelerator Mass Spectrometry (AMS) absolute dating. The sampling procedure is described, while pre-treatment for organic sediment dating has already been outlined (Donner & Geurds 2018).

6.1 CLEANING AND STORAGE OF MATERIALS

All the sherds recovered during the stratigraphic excavations were washed with tap water, using a toothbrush on recent fractures and fingers on the external and internal walls to avoid damage of surface finishing and decorations, as well as the creation of fake macrotraces.[66]

After cleaning the materials, they were left for a full day to dry in the shade and placed on top of cardboard unfolded boxes for water absorption. Later, sherds were stored in clean zip-lock bags with their corresponding tags, indicating their excavation contexts. Afterwards, the bags were stored in seven different plastic boxes, organized by site and excavation unit, for easier access (**figure 86**). Also, each box included an inventory of the bags that it contained. The same procedure was applied for the other types of materials found during the excavations: ground stone, chipped stone (obsidian was stored separately), and burnt clay. Animal bones, starch and phytoliths were stored following specific protocols to ensure their optimal preservation (Angeles Flores 2019; Gill *et al.* 2019).

66 For macro and microbotanical remains, as well as future use-wear investigations, various types of artifacts (ceramic, chipped stone, and ground stone) were selected in the field and collected using surgical gloves with a sterilized trowel together with associated sediment. Additionally, sediment from all stratigraphic units was collected for further analysis.

Site Name	Site Code	#Test Pits	2x2m	1x1m	3x1m	2x1m	TOTAL
Aguas Buenas	AB	6	6				3020
Alberto Obando	AO	3	3				875
La Zarcita	ZAR	6	6				458
La Vaina	LVA	4		4			13
Jerry Hernández	JH	5		5			16
Lázaro Villegas	LV	2	2				1972
Sebastián Ríos	SR	1	1				71
La Aventura	LA	3	3				2034
Sebastián Ríos Histórico	SRH	2	2				390

Table 16: Quantification of ceramic materials including the amount and different types of excavation units they were retrieved from.

Materials were stored and macroscopically analyzed at the PACEN Project house in Juigalpa, as well as in the Museo Comunitario Juigalpan. A sample was exported to The Netherlands for archaeometric analyses, which were were conducted at the Laboratory of Artefact Studies, Faculty of Archaeology, Leiden University.

6.2 MACROFABRIC GROUPING

The classification approach took into account the craftsman's perspective, whose first choice—after deciding which end product is desired—is related to the recipe for manufacturing ceramic vessels. This selection can be influenced by ecological (Arnold 1985), cultural (Gosselain 1999; Gosselain & Livingstone Smith 2005), political power and land ownership related issues (Sillar 2000), pottery end products (Arnold 1971; DeBoer & Lathrap 1979), or vessel performance (Rye 1981; Braun 1983; Shepard 1985; Bronitsky & Hamer 1986; Skibo *et al.* 1989; Orton & Hughes 2013). Clay procurement and paste preparation practices may also result from a combination of several of these variables.
In pottery analysis, paste and fabric are used as synonyms to refer to the composition and structure of the fired clay body from which pots are made. Pottery fabric consists of two different elements: the matrix—comprised of clay minerals—and the inclusions. The latter can be seen by the naked eye or a low power microscope, whereas the matrix needs high powered microscopes, such as polarizing light and SEM (Rye 1981; Shepard 1985; Orton & Hughes 2013).
The study of pottery fabrics, which include the description of physical characteristics, appearance, and composition, yields valuable information on raw materials, technological choices in clay preparation practices, firing techniques, use, and post-depositional processes (Orton & Hughes 2013).

6.2.1 SAMPLING FOR MACROFABRIC GROUPING

The first step at the lab consisted of the quantification of the universe of pottery fragments for research, which comprised a total of 30178 sherds. The quantification of the ceramics per site is summarized in **table 16**. The number of fragments was achieved through sherd count in combination with weight measurements, because these two strategies together can provide better comparisons (Orton & Tyers 1990) as well as a more accurate approach to quantification. This collection was retrieved through systematic stratigraphic excavations in nineteen different archaeological sites throughout the research area.[67] This selection includes the site of La Pachona, located approximately six kilometers south of Juigalpa, which was excavated by Roosmarie Vlaskamp and her crew as part of her PhD thesis at the Faculty of Archaeology in Leiden University. La Pachona was initially included in the sample to broaden the spectrum of the available collection by taking into account a Cuisalá River associated site as a comparative parameter with the valley. Even though all materials from the selected unit at La Pachona were quantified and preliminary classified, and all rim sherds were drawn, time constraints made full analysis impossible. Instead, results will be published in a separate paper.

67 See Chapters 4 and 5 for methodology and descriptions of the excavated contexts.

Site Name	Site Code	TOTAL	% of Total
Aguas Buenas	AB	906	30 %
Alberto Obando	AO	262	30 %
La Zarcita	ZAR	137	30 %
La Vaina	LVA	13	100 %
Jerry Hernández	JH	16	100 %
Lázaro Villegas	LV	591	30 %
Sebastián Ríos	SR	71	100 %
La Aventura	LA	610	30 %
Sebastián Ríos Histórico	SRH	117	30 %
Quebrada Profunda	QP	73	100 %
Alcides Montiel	AM	31	30 %
Barillas	UBI	1,017	25 %
Rosa Dolores Oporta	RDO	86	30 %
Wilder Marín	WM	128	30 %
Oporta	OP	370	30 %
Josefa Ocón Robleto	JOR	331	30 %

Table 17: Percentage of sampled sherds after quantification and preliminary analysis. The highlighted sites were the ones then selected for complete examination.

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Ceramic Sampling Form

Context	
Site	
Excavation Unit	
Stratigraphic Unit	
Level	
Bag Number	
Weight	

	Number	< 50 mm	> 50 mm	Sampled
Rim (Open)				
Rim (Closed)				
Rim (NI)				
Rim/Neck (Open)				
Rim/Neck (Closed)				
Rim/Neck (NI)				
Neck/Shoulder (Open)				
Neck/Shoulder (Closed)				
Neck/Shoulder (NI)				
Body (Open)				
Body (Closed)				
Body (NI)				
Base (Open)				
Base (Closed)				
Base (NI)				
Support				
Lug				
Handle				
Total				

Figure 87: Sampling form designed for this study.

In theory, sherds of >5 cm on their longest side are ideal for technological analysis (Roux 2016). For that reason, the universe studied in this manuscript is problematic, since some sites present a lot of fragmentation (such as Sebastián Ríos Histórico and Alcides Montiel, for example), and others are distinguished by very large pieces, of around 8 cm on their longer axis (for instance, La Pachona and Sabana Grande). Orton and Tyers (1990) divide fragmentation in two different categories: brokenness and completeness. Brokenness is a result of the ceramic properties combined with the sherd's post-depositional history; whereas completeness refers only to post-depositional processes. Therefore, fragmentation variations can be the result of several different factors, such as dissimilar firing temperatures, taphonomic processes, and the biography of vessels, among others. This variability represented a methodological challenge, and discarding smaller fragments during analysis was not considered since this practice can bias the sample. This idea was reinforced after assessing the preliminary results obtained from fragments excavated in Aguas Buenas in 2012 that were smaller than 5 cm. Apart from that, unlike the previous chronology for the area (Gorin 1990), decoration techniques were not granted the highest level in the hierarchy of attributes. The scope of this study focuses on identifying social identities, continuities, and disruptions of the communities of potters through the steps of the manufacturing sequences. Therefore, a stress on decoration techniques—which are among the most unstable factors in pottery industries (Gosselain & Livingstone Smith 2005)—would not be coherent with this theoretical and methodological approach. Consequently, special attention was paid to the more stable methods and techniques, related to the roughing out phase of the manufacturing process (Roux 2011; 2016).

Due to the multiplicity of analytical steps, together with the aim of reducing the number of samples requiring exportation, 30% of the total universe was initially sampled. Sites with a larger quantity of sherds, though, such as Barillas and Sabana Grande, were sampled differently. In the first case, since the excavations retrieved more than 9000 fragments, 20%

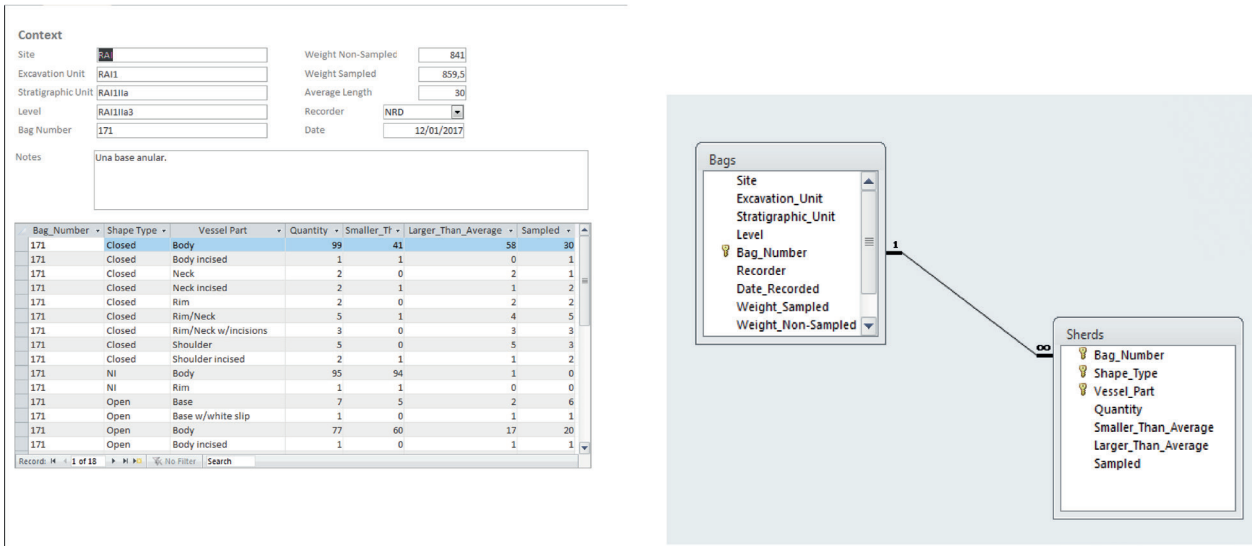

Figure 88: Microsoft Access database for sampling ceramic sherds.

was selected in order to secure a representative sample of the universe. In the second case, Barillas, with more than 4000 fragments, 25% of the assemblage was sampled. Other exceptions to the 30% rule were La Vaina, Jerry Hernández, Sebastián Ríos, and Quebrada Profunda, because their population was below than 100 sherds. As a result, analysis included 100% of their fragments. In contrast, Alcides Montiel was sampled following the 30% rule, since its stratigraphy is problematic, as described in Chapter 5. Quantification of the sample chosen for the study is outlined in **table 17**.

To achieve these percentages, a multi-stage sampling procedure was applied, combining cluster, random, and stratified random sampling strategies (Bernard 2002; Drennan 2009) to ensure the representativeness of all layers of the population within a research universe (Bernard 2002). Therefore, the sampling strategy involved different phases, which included clustering by site, excavation unit, stratigraphic unit, and level. Then, vessel parts were grouped according to the categories established for the database, so a representative sample of rims, rim/necks, neck/bodies, bodies, bases, supports, lugs, and handles were selected. The reason for clustering the different parts of the vessels separately lies in the fact that one of the essential elements in the identification of the *chaîne opératoire* is to recognize the methods and manufacturing techniques applied on the various parts of the pots, ideally involving vessel reconstructions as well. Therefore, the first approach to the macroscopic analysis consisted of a basic division to identify the main phases of the manufacturing process.

To control the sampling, workflow was organized by site, stratigraphic unit, level, and bag. An individual form was filled in for each bag (**figure 87**), first detailing all contextual information and vessel part (body, neck, rim, rim/neck, shoulder, base, etc.) with an annotation regarding decoration (incisions, punctuations, white slips, etc.), as well as a preliminary assessment of shape type (close for restricted, open for unrestricted, and NI for non-identified morphologies). Also, the quantification included the total number for each category and weight, as well as the division between fragments larger and smaller than the average, which was mathematically calculated per site. To do this, the longest axis of all fragments measured and then the average was calculated, which became the standard for each stratigraphic unit within sites. After this calculation, 30% of all vessel parts larger than the fixed measure, open, closed, and NI were sampled for macrofabric characterization.

The sampling form (**figure 87**) used to record this step of the method is an adaptation from the form proposed in the Leiden Code Book for Caribbean Ceramics (Hofman 2005). All the data recorded in the paper forms was then digitized in a Microsoft Access database designed by Leontien Talboom (UCL) (**figure 88**).

6.2.2 HANDLING OF SAMPLES

After the quantification and sampling of the universe of sherds, fragments were labeled using a code comprised of site name, excavation unit (Arabic numbers), stratigraphic unit (Roman numbers), and arbitrary metric level (Arabic numbers). For example, sherds collected on Aguas Buenas, excavation unit 2, stratigraphic unit III, level 4, were labeled AB2. III.4. As a result, each ceramic fragment kept all the necessary stratigraphic information for later chronological interpretations. When these codes were too long to write on the ceramic sherds, an alternative code comprised of site name, excavation unit, and bag number was used on the sherds.

Once labeled, the materials were analyzed by site. Before classification, an examination of the stratigraphy of each site was conducted.[68] If two or more assemblages presented similarities at the sampling stage, they were later analyzed on tables placed next to each other, to facilitate comparisons but ensure continued separation. Also, stratigraphic units and arbitrary metric levels were never mixed; however, when fragments of a single pot were found in several of them, a re-evaluation of the stratigraphy took place immediately.

The basic activities performed with the materials at this stage of the analysis involved handling, making small section cuts, drawing and photographing different vessel parts and techno-markers, examination under the stereomicroscope, measurements, weighing, and descriptions.

After assessing these variables in combination with the stratigraphic analysis of all contexts excavated, seven different sites were sampled for macrofabric characterization: Aguas Buenas, Alberto Obando, Oporta, Josefa Ocón Robleto, Barillas, Rosa Dolores Oporta, and La Aventura. Chapter 7 only focuses on these sites, but some references to the rest of the sites can be found on Chapter 8.

6.2.3 ATTRIBUTES FOR MACROFABRIC CHARACTERIZATION

Attributes are observable physical properties, meaning that they are part of the basic analytical units in pottery technology, because they are related to specific techniques. In ceramic assemblages, there are common attributes which are shared, but also discriminatory attributes, which aid in setting up the boundaries between groups. In the macrofabric stage of this study, descriptions incorporated nine basic attributes: inclusions, voids, cross-section core-margin relationships, color, hardness, fracture, feel, thickness, and radius.

- *Inclusions*: clays usually contain other minerals in addition to the clay minerals themselves, as well as organic materials. These particles are known as inclusions, which can be related to parent rocks, erosion and transport, deposit conditions, and other factors (Rye 1981; Shepard 1985; Orton & Hughes 2013).
- *Voids*: the gaps between or inside solid particles (Rice 2005) are referred to as pores or voids. They may be the result of technical gestures (such as kneading), organic inclusions or tempers (for example, plants), or naturally occuring. They can be key to understanding certain aspects of the *chaîne opératoire* and the nature of the raw materials employed in pottery manufacture.
- *Cross-Section Core-Margin Relationships:* when making fresh section cuts on sherds fired lower than 1000 °C, sometimes variability can be observed in the core's tone when comparing it to the margins of the section and/or the surface (Rye 1981; Shepard 1985; Orton & Hughes 2013). This differentiation is related to the carbonaceous content of the clay, in combination with the firing atmosphere, temperature, and duration. The typical "sandwich" core, for example, is related to short duration and/or low temperature firing, which causes the surface carbon to burn and exit as carbon dioxide, while the one present deeper in the clay does not burn completely and therefore shows a dark coloration (Shepard 1985).
- *Color*: this attribute is first related to clay composition (especially iron compounds and carbonaceous matter), firing atmosphere, temperature, and duration, as well as post-depositional processes (Shepard 1985). Then, color is also changed or "disguised" in the following chapters of the vessel's life history after it has been fired due to the absorption of stains during use, wear, deposition of carbon in cooking, or substances from the soil after discard (Rye 1981; Shepard 1985).
- *Hardness*: the pot's resistance to penetration, abrasion, and scratching provides valuable information on serviceability. However, hardness is problematic because lots of

68 See Chapter 5.

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Ceramic
Macro-Fabric
Group

Form
Page 1/2

Contextual Data	
Macro-Group Code	
Site	
Excavation Unit	
Stratigraphic Unit	
Level	
Bag #	
Weight	

Color		
Cross section	Core	
	Int. Margin	
	Ext. Margin	
Internal Surface		
External Surface		
Slip		
Paint		

Inclusions	
Identity	
Frequency	<5% - 5% - 10% - 15% - 20% - 25% - 30% - 35% - 40% - 45%
Size	Pebbles / Granule / Very Coarse / Coarse / Medium / Fine / Very Fine / Silt
Sorting	Very well sorted / Well sorted / Moderately sorted / Poorly sorted
Roundness	High / Low Sphericity
Shape	V. Angular / Angular / S-Angular / S-Rounded / Rounded / W. Rounded / Irregular / Flat
Orientation	Parallel to wall / Sub-Parallel to Wall / Horizontal / Oblique / Concentric / Chaotic
Color	

Voids	
Visible	YES - NO
Shape	Plate-like / Oval-Sphere / Rhombs / Irregular
Orientation	Parallel to wall / Sub-Parallel to Wall / Horizontal / Oblique / Concentric / Chaotic

Other Characteristics	
Hardness	Soft / Hard / Very Hard
Fracture	Subconchoidal / Smooth / Fine / Irregular / Hackly / Laminated
Feel	Harsh / Rough / Smooth / Soapy / Powdery

Core-Margin Relationships	
A	1 - 3 - 5 - 7 - 9
B	2 - 4 -6 - 8 - 10

Figure 89: Macrofabric group paper form.

processes affect it, such as firing duration, porosity, inclusion grain-size and distribution, and post-depositional mechanisms (Orton & Hughes 2013). However, it was included as an attribute in the analysis because it remains a standardized procedure in ceramic analysis and is helpful in well preserved collections.

- *Fracture*: the particular way in which potsherds break is related to firing temperature, the amount and size range of inclusions, and even fashioning techniques (Orton & Hughes 2013; Roux 2016).
- *Feel*: the combination of hardness, inclusions, and surface treatment gives a particular "feel" to the sherds, which is a very good empirical tool for fast identification. Even though it is a very subjective attribute, it has proven to be useful in previous classification experiences (Donner & Hernández Arana 2018).
- *Thickness*: the variation in the widths among vessel parts and between vessels is related to the size of the inclusions, firing techniques, drying processes, end product uses, etc.
- *Radius*: the radii of different parts of pots (rim, neck, mouth, body, base) are relevant in the reconstruction of ancient cooking, eating, drinking, and storage practices.
- *Percentage estimate of the total of the vessel*: using the same chart applied for calculating the radius, the percentage of the vessel represented by the sherd was also calculated.

6.2.4 ANALYTICAL STEPS

The sampled fragments were classified into different clusters based on various characteristics of their fabric, establishing ranges of variation within groups to avoid over-splitting but also taking into account differences to avoid lumping. Once these preliminary groups were created visually, the analysis was refined with a thorough fabric description. To begin with, inclusions were characterized, since they are the largest features present in pottery fabric. To describe them, different categories were taken into account, as shown in the macrofabric group form within the section dedicated to inclusions (**figure 89**).

Name	Grade Limits (Diam. in mm.)
Pebble	64-4
Granule	4-2
Very coarse	2-1
Coarse	1 - 0.5
Medium	0.5 – 0.25
Fine	0.25 – 0.125
Very fine	0.125 – 0.0625
Silt	0.0625 – 0.0039

Table 18: Classification of different textures (modified from Shepard 1985, 118).

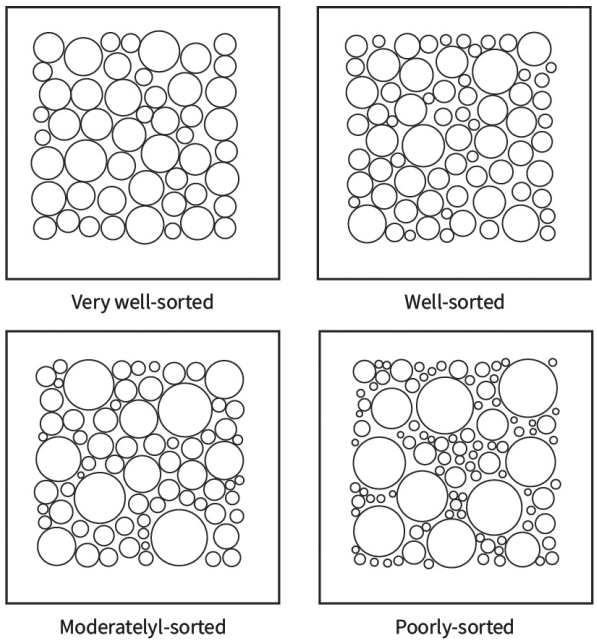

Figure 90: Visual diagram to classify sorting (redrawn from PCRG 2010, 50).

Whenever possible, a key to identify inclusions was applied (Peacock 1977). When that was not possible, generic descriptive values were used, such as red dots, elongated black plates, grey angular, etc. The preliminary identification of inclusions, which are the most visible features of the fabric, was important to characterize each macrofabric group easily. For frequency, or the proportion of inclusions present in the fabric, a visual chart (Matthew *et al.* 1991) was applied. Taking into account the inclusion size in mm (0.5, 0.5 to 2.0, and 0.5 to 3.0), frequency was recorded using percentage values (<5%, 5%, 10%, 20%, 30%, and >30%). For classifying texture, grain size was measured and characterized using the geometric ratios proposed by Shepard (**table 18**), which were based on the Wentworth scale.

For sorting, understood as an assessment of homogeneity or heterogeneity of the relationship between inclusions as well as inclusions and clay matrix, a diagram was used (PCRG 2010, 50) (**figure 90**).

To characterize roundness and shape, visual charts were applied (PCRG 2010, 52). Sphericity was classified as either high or low (**figure 91**), and then shape was sorted into one of the six different classes for each type of inclusion.

Regarding orientation, which can aid in the identification of fashioning and pre-forming techniques, suggestions by V. Roux (2016) and S. Manem (2008) were followed. Accordingly, the orientation of the inclusions was classified according to their relationship with the vessel wall (**figure 92**).

The different colors of the inclusions were recorded using the Munsell soil color system. Apart from that, the cross-section margin relationships established by Orton and Hughes (2013) chart and code (based on Rye 1981, 116) were applied, which provide valuable information on firing temperature, duration, and atmosphere (**figure 93**). New categories for establishing these relationships were established in this research and then added to the chart. Additionally, the Munsell soil color chart was used to record the color of the different parts of the cross-section (core, internal margin, external margin), as well as the internal and the external surface, slip, and paint when present.

For describing voids, the first step consisted of identifying their presence or absence, then their shape (plate-like, oval-sphere, rhomb, irregular), and finally their orientation, using the same criteria applied for inclusions. Also, hardness was measured according to the Mohs scale. Fracture was described according to six different variants: subconchoidal (when the fracture resembles those found in flint or obsidian), smooth (when no ripples are visible), fine (when the cutting device cuts through the inclusions), irregular (fractured around inclusions), hackly (similar to the hackles on a dog's back; it is

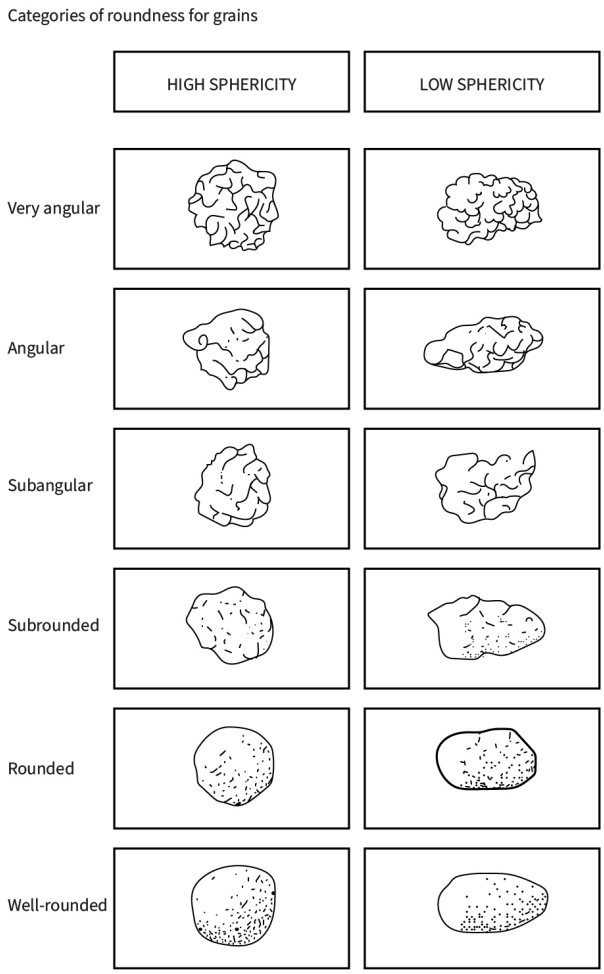

Figure 91: Visual chart for characterizing roundness and shape, (redrawn from PCRG 2010, 52).

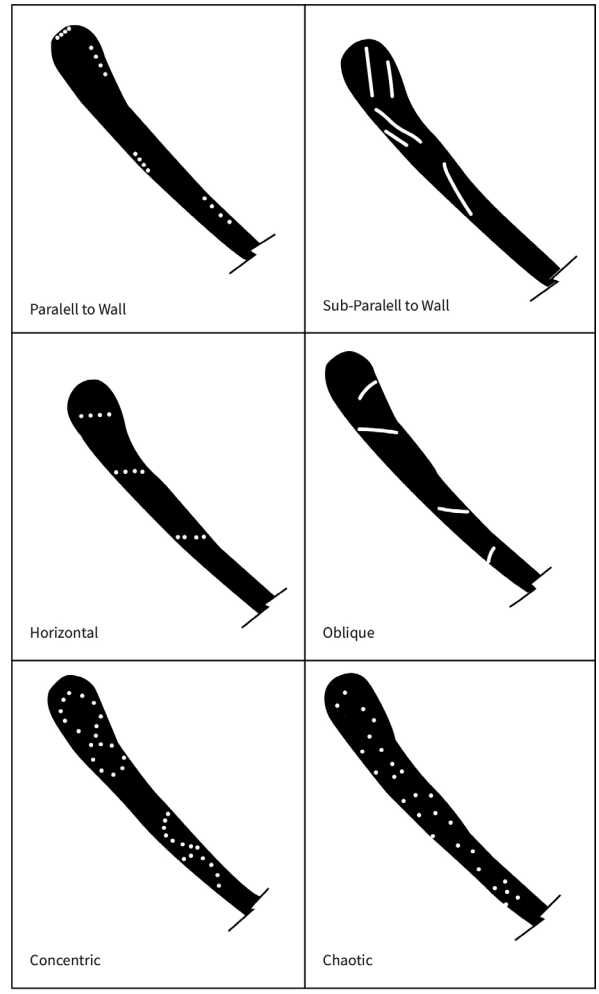

Figure 92: Visual chart to classify the different types of orientations for inclusions and voids.

jagged, sharp, and uneven), and laminated (when layers are visible). Finally, the "feel" classification was included, which was described by rubbing the thumb on the sherd's surface.

Following V. Roux's (pers. comm. 2017) suggestions, each macrofabric group was subdivided according to the presence or absence of coating, as well as its position. A simple numerical codification system was used for this, which was attached to the name of each macrofabric group. In this system, the number 1 stood for coating on the external surface of the sherd, number 2 for the internal wall, number 3 for cases in which both surfaces were coated, and number 4 for samples with no coating at all. As a result, macrofabric groups were referred to as, for example, AB2.E2, which means that this group corresponds to Aguas Buenas excavation unit 2, macrofabric group E, sherds coated only on the internal surface. Each macrofabric subgroup was weighed for later assessment of choices regarding coating practices.

Once macrofabric groups were characterized and described, all rims were drawn using a standardized guideline (Bagot 1999) and were photographed—together with the decorated samples—using a professional LUMIX camera and a tripod, artificial and daylight.

The creation of macrogroups was a fundamental tool to approach the assemblage for the first time. It yielded invaluable information on the range of clays used for pottery manufacture in the area of

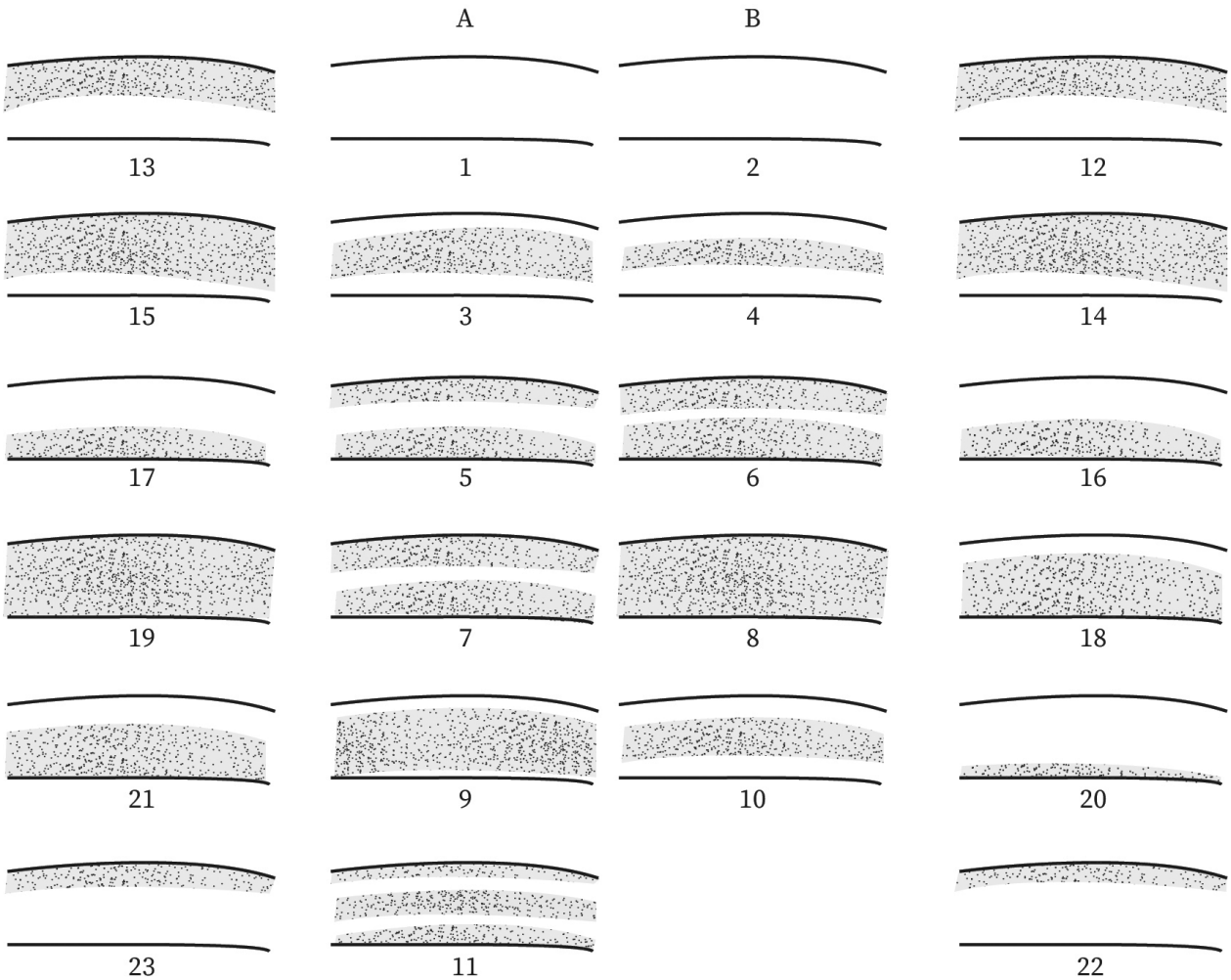

Figure 93: Cross-section margin relationships (adapted from Rye 1981, 116).

study, as well as some insights on manufacturing techniques, morphostylistic features of the pottery, its possible uses, and firing technologies. Apart from that, it provided a general panorama of the similarities and differences among the excavated contexts. As a result, macrofabric characterization aided in the preliminary identification of possible paste recipes, which were later confirmed or discarded by thin section petrography, and also related to different fashioning choices, which were examined through a technological analysis.

6.3 TECHNOLOGICAL ANALYSIS OF MACROSCOPIC TRACES

As discussed in Chapter 3, the study of manufacturing processes is of extreme importance when research questions and goals are related to situated ancient craft practices. That is, to be able to actually construct narratives of the different itineraries of pottery manufacturing practices, it is necessary to deepen understandings of those community-shared knowledges, learning processes, and bodily gestures. As archaeologists, one of the most valuable tools to achieve this goal is the examination of the actual pots and sherds. Complementing and challenging this with

archaeometric analytical techniques provides an overall insight into the different processes. In particular, this stage of the analysis was pivotal for further sampling, as well as characterization of the sample variability at the inter and intra site level and of the synchronic practices within and between the different ancient communities examined. Consequently, the identification of diagnostic traits for techniques, methods, procedures, tools, and different gestures or bodily practices through archaeological ceramics is the most powerful means of studying social identity through ceramic manufacturing technology.

The main objective of this stage of the research was to identify the principal technological groups available in the collection. Consequently, the methodology used in this study for characterizing macroscopic technological analysis of pottery is the one that was proposed by V. Roux (2011; 2016). The method was developed after decades of both ethnographic and laboratory research and built upon a mountain of previous ethnographic, experimental, and analytical research. To ensure the correct application of the methodology, personalized training from S. Manem at the Institute of Archaeology, University College London (October 2016) and V. Roux at the Maison d'Archéologie & Ethnologie in Paris (February 2017) was received. For the definition of the basic categories of analysis, a combination of Roux's model with classical work such as Rye (1981), Shepard (1985), Sinopoli (1991), Rice (2005), Orton and Hughes (2013) was applied. The concepts employed during analysis were described in Chapter 3, so the next subsection will explain the laboratory work process.

6.3.1 SAMPLING FOR TECHNOLOGICAL GROUPING

Macroscopic analysis of technological traces has considerable logistic advantages and disadvantages. On the one hand, it is a low cost and low-tech method; thus, it is very easy to mount a mobile lab that can be used anywhere, especially with simple devices such as a Dino-lite portable microscope. On the other hand, reconstructing the full operational sequence is highly time-consuming,[69] and the total universe (even after the 30% initial sampling) consisted of more than 6500 sherds. Thus, to avoid a superficial examination of the manufacturing processes, an additional sampling strategy was applied at this stage of the analysis to achieve a number of sherds which could be subjected to complete analysis according to the time allotted for this study. Without sampling, this analysis would have been limited and would have not allowed for the reconstruction of operational sequences, but only the assessment of the first few techniques, such as fashioning and pre-forming.

Operational Sequence Step	Percentage	No. of Sherds
Fashioning	100% of total	3710
Pre-forming	30% of total	1113
Finishing	15% of total	556
Surface treatments	15% of total	556
Decoration	100% of total	298

Table 19: Outline of the different analytical approaches applied to diverse sampling groups.

Therefore, sampling at this stage proved to be essential to the objectives of this research and was applied combining two different strategies from probabilistic methods: stratified random sampling and cluster random sampling (Bernard 2002; Drennan 2009). Within the macrofabric groups previously outlined, fashioning technique was examined in 100% of the universe (see **table 19**), then 30% for pre-forming, and 15% for finishing and surface treatments. All decorative techniques were described and quantified. Monochromes (including slipped fragments) were not quantified as decorated, but their occurrence was measured and compared to non-coated samples.

6.3.2 IDENTIFYING TECHNICAL GESTURES: ANALYTICAL STEPS

Within the macrofabric groups previously outlined, technological groups were created based on the examination of macroscopic traces of technical gestures. Fragments from the same pot were identified and grouped together, following a sherd count criterion (Orton & Tyers 1990).

The general analytical procedure and terminology was based on S. Manem's checklist for analyzing ceramic technology.[70] Also, a manual for identifying

69 For example, a preliminary study of fashioning techniques on 884 sherds took just two weeks to complete, while a thorough examination of 30 samples was conducted over two months. A thorough technological assessment of a collection that size would take at least four months working full time.

70 Manem's form was designed for the European Research Council Project EUROFARM: Transmission of innovations: comparing and modelling the spread of farming practices in Europe. His methodology was first developed for his PhD dissertation, *Les fondements technologies de la culture des Duffaits (Age du Bronze Moyen)* (Manem 2008), which was co-supervised by V. Roux (2016) and then edited for his current project.

technological traces especially for fashioning and pre-forming in handmade pottery was followed (García Rosselló & Calvo Trias 2013), in conjunction with standard guidelines (Rye 1981; Shepard 1985; Rice 2005). According to S. Manem (pers. comm. 2016) it is important to follow a strict procedure in the analytical process, where observations are recorded first according to the form and interpretations are made at the end of the process. Therefore, the database consisted of two main parts, the recording of the observations first and the interpretative section at the end. These two databases were combined when integrating both archeometric and macrotrace analysis.

Within each macrofabric group, first the different parts of vessels were analyzed to try to identify regularities and variations in base, body, neck, and rim fashioning, pre-forming, finishing, surface treatment, and decoration. Therefore, the procedure outlined in the following paragraphs was conducted first on the various vessel parts and then projected onto hypothetical complete vessels to reconstruct full operational sequences.[71]

First, I describe the topography in relationship to the cross-section (regularity, thickness) and the internal and external surfaces (depressions, fissures, cracks, fractures, digital impressions), as well as protuberances (bumps, thickening, crests, compression folds). Also, I look at the modes of fracture, their orientation (random or preferential), and profile (straight, U shaped, oblique). These features provide evidence for different fashioning techniques; for example, they allow me to interpret the presence of assembled elements or the construction of the vessel from a clay mass. Also, even in the case of homogenous fashioning techniques, I can identify differences in coil sizes, for instance, or techniques for placing them (vertically, from inside to outside, from outside to inside, alternatively, etc.)

Additionally, I looked at internal and external surfaces, focusing on color, brightness, granularity (highlighted, covered, floating, inserted, microextracted), microtopography, striation patterns, and microrelief. These attributes are excellent for identifying fashioning and especially pre-forming techniques on either wet or leather hard clay.

Then, I recorded the structure of the cross-sections, taking into account their nature (continuity), morphology, porosity distribution, level of pore compression, pore morphology, and orientation of inclusions. This step of the analytical procedure aids in the identification of mainly fashioning and pre-forming techniques.

For interpreting the fashioning and roughing out, four parameters were taken into account: elemental volume (homogeneity), forces (pressure or percussion, type, localization, and orientation), types of pressure, and hydric state of the paste. When possible, a preliminary separation between the two main fashioning techniques, which either involve assembled elements or a clay mass, was conducted. Within these variables, pressure (pinching, drawing, crushing) and percussion (beating) gestures were identified. In case of coiling or slabbing techniques, the particular mounting (spiral, double spiral, rings, segments, stretched coil/s) and joining (straight, oblique, U) procedures, as well as specific sizes of assembled elements, were thoroughly described.

Regarding tools, their context of utilization (wet or leather hard clay), orientation (gesture), type (active or passive), forces, function, material, and morphology was interpreted when possible. Finally, pre-forming techniques were classified into two main categories; wet clay and leather hard clay techniques, which were in turn classified relative to the different types of force, pressure and percussion.

Also, the procedures for assembling elements (base, body, neck) were described. First, the different articulation modes were observed between each assembled element, such as supports and base, base and lower body, lower body and upper body, upper body and neck, and base-body-neck. Then, the modalities for reinforcing the junctions between elements at different sections were examined, for example between supports and base (internal and external), between base and body (internal, external, and embedding), lower body and upper body, and so on. Additionally, fashioning of appendages (supports, lugs, handles, etc.) was analyzed first by classifying the technique (rolling, drawing, modelling, coiling) followed by the type of insertion (wet clay or leather hard clay).

Regarding finishing, both the internal and external surfaces of fragments were observed, first establishing the hygrometric state of the clay and then the different techniques that were applied. For wet clay, smoothing was separated in two different ways: the technique that

71 During excavations, only two complete vessels were recovered (one from the site of Barillas and another one from RDO).

adds external water to the process and the technique that only works with the humidity of the clay. For leather hard clay, smoothing and brushing were differentiated mostly focusing on the different striation patterns. Also, pressure was recorded according to continuous versus discontinuous application and if any traces of finishing tools were identified.

For surface treatment, internal and external surfaces were analyzed separately, starting by separating the different surface treatment techniques. Then, friction techniques, such as burnishing (with or without rehydration), polishing, and lustrage, were described. Then, coating techniques were characterized according to the materials employed: clay (*barbotine*, plastering, slip), organic materials, graphite, silica, smoking.

Decoration styles may vary according to their location (base, body, body/neck interjection, neck, or rim) within a vessel, which was described first. Then, the different techniques were recorded, such as paint (surface) and impression (wet, leather hard or dry clay), which can be punctual, tilted, rotated, stamped, or beaten, performed with a tool or with the fingers. Incisions were characterized according to their hygrometric status, different techniques (punctual, rotating, scraped, and engraved), gestures (continuous, discontinuous), and tools. Excision was also classified according to the hygrometric degree of the clay, gesture, and tools. These three techniques—impression, incision, and excision—were classified within the category of decorative techniques that imply a removal of clay from the surface, either internal or external. In contrast, relief techniques were split into two main types. First, those that entail the application of elements, which are divided according to the hygrometric status of the clay and the form of the element, which can be either a rope, pellet, or button. Second, the elements that are modelled and then added to the vessel.

Finally, interpretations related to firing technology were included. First, the two different types of atmospheres, either oxidation or reduction, were taken into account. Then, specific techniques applied were classified in relationship to their contact—or lack thereof—with fueling agents.

6.4 ARCHAEOMETRIC ANALYSIS

Archaeometric analysis of ceramics employs methods from the physical sciences to identify the specific fingerprints of raw materials modified by past human behavior (Glascock 2016). Particularly, it groups like objects according to the types of raw materials employed in manufacturing processes, allowing us to make interpretations concerning raw material sourcing, ceramic provenance, production sites, trade, exchange, distribution, and migration, as well as providing some insights into production techniques (Quinn 2013; Glascock 2016). Consequently, "(...) scientific measurements (...) are not only powerful tools for the characterization of matter, but are also the mean of understanding and quantifying a variety of phenomena that are important for modern everyday life and past human achievements" (Artioli 2010, 16).

This type of analysis can be split into two main categories. On the one hand, mineralogical approaches study the properties of minerals in ceramics. X-ray diffraction (XRD) and the application of the polarizing light microscope to observe thin sections are examples of these techniques. On the other hand, geochemical approaches focus on characterizing the signature elements to the level of parts per billion. Neutron activation analysis (INAA), X-ray Fluorescence (XRF), and inductively coupled plasma mass spectrometry (ICP-MS) are some of these techniques (Quinn 2013).

Both approaches are complementary, and their combination can provide powerful insights into production, consumption, and distribution practices (Tite 1999). That's why "Optimally, characterizing a ceramic involves both mineral and chemical methods" (Peacock 1970, 381), so the results obtained by both types of techniques should be compared and contrasted and not seen as mutually exclusive or redundant.[72] For example, chemical characterization provides unique information concerning the trace constituents of the material, and only mineralogical techniques can elucidate the structure of the fabric (Rice 2005).

There are several aspects that need to be taken into account to select the appropriate compositional analytical techniques. First, archaeological research questions regarding pottery manufacture practices need to be translated into scientific hypotheses that can be tested in physicochemical categories (Rice 2005; Orton & Hughes 2013). Second, it is

72 For a good example of how the research community can view these approaches as "rivals", see the debate on "Olmec" ceramic provenance (Donner 2015).

necessary to formulate specific research questions about different steps of the operational sequence, which will directly influence the part of the ceramic fragment to be manipulated. For example, if the goal is to study clay procurement and clay recipes, then analysis should focus on paste and inclusions rather than slips or paints. Following the same example, special attention is paid to the body of the sherd and not its surface, as well as on bulk compositional rather than point analysis (Rice 2005). Also, it is relevant to check previous studies in the area or region in order to situate the project in a regional or more synthetic perspective and contribute useful reference materials. Apart from that, the study must be deemed primarily qualitative or quantitative. The first type focuses on the external appearance of materials, and it deals with presence and absence of properties (such as minerals, or elements); whereas the latter measures their amount (Rice 2005; Artioli 2010) .

In this study, thin section petrography was applied to a sample which was selected based on the results of all previous analytical techniques (macrofabric and macrotrace analysis). Moderate time, low cost, and relatively low destruction rates favored this technique, as well as the ability to re-utilize the samples.

6.4.1 SAMPLING FOR ARCHAEOMETRIC ANALYSIS

One of the most complicated decisions to make in pottery analysis relates to the number of samples required to establish compositional groups. Even though it has been suggested that a group is minimally constituted by ten examples, some circumstances do not allow such resolution. However, the relationship between number of analyzed samples and degree of confidence in data interpretation is directly proportional (Orton & Hughes 2013). As a result, the technological groups defined within the different macrofabric clusters were sampled proportionally for compositional analysis; this will allow for the reconstruction of the different steps involved in production sequences. A mineralogical characterization will also define tendencies in local potting practices and their development through time at the community level, as well as the connections among different communities. Therefore, when time or budgetary restrictions affected the sampling process, priority was given to dominant and secondary classes, consisting of more than 60% and 20% of the universe respectively (Roux 2016). When case groups were distributed equally (for example, all range between 15-18% of the universe), all of them were analyzed proportionally. The analysis started with the most regular groups so that outliers can then be correlated (when possible) to them.

The total sample analyzed (167 fragments) was selected for compositional analysis through a probabilistic strategy that combined random stratified sampling with random cluster sampling (Bernard 2002; Drennan 2009). A two-stage sampling plan was followed, which first concentrated on the techno-petrographic groups and then on subgroups (Orton 2000). As a result, samples from the majoritarian macrofabric groups were selected; rim sherds were given priority due to the fact that they link manufacturing steps with specific end products, but bases and body sherds were also included in order to elucidate variations in the production sequences depending on the different parts of the vessel.

6.4.2 MINERALOGICAL CHARACTERIZATION

Since low-fired, relatively coarse ceramics share characteristics with rocks and sediments (Rice 2005; Reedy 2008; Peterson 2009; Orton & Hughes 2013; Quinn 2013), a set of techniques originally applied in petrology and earth sciences was borrowed for the study of pottery. Mineralogical characterization aids in the identification of minerals, their abundance, and associations in the clay body and both internal and external surfaces. Also, it helps examine particle orientations; void sizes, shapes, and locations; surface treatments; and firing alterations, as well as post-depositional factors (Rice 2005).

Petrological techniques applicable to ceramics can be divided in three. First, thin section petrography; second, textural analysis (which can be done in combination with the former); and lastly heavy mineral analysis (Orton & Hughes 2013). This study concentrated on the first technique, which provides a good preliminary overview of the materials' variability, as well as indicates further research questions to be answered through future chemical analysis.

Thin section petrography

Thin section petrography mainly consists of the analysis of 30 µm thick ceramic fragments under the polarizing microscope,[73] a device that shows how

73 Samples of 20-25 µm (ultra thin sections) are sometimes used for analyzing building materials or fine high temperature ceramics (Quinn 2013).

a transparent substance affects light that passes through it (Rice 2005). In particular, thin section petrography examines the optical properties of minerals through plane polarized light (PPL) and cross-polars (XP), which allow for the identification of crystalline phases, their relationship, texture, morphology, and size (Artioli 2010). Therefore, it is an excellent preliminary technique to achieve an overall geological perspective of the assemblages examined. Such a perspective can be complemented later with further textural analysis, as well as with geochemical approaches (Artioli 2010). However, this technique has a value that sets it apart from other archaeometric techniques—such as geochemical approaches—because it not only aids in answering questions about provenance, but also addresses technological choices (Quinn 2013). For that reason, in this study, thin section analysis is referred as a techno-petrographic classification (Roux 2016).

The technique was applied for the first time on archaeological ceramics during the last half of the nineteenth-century by a few pioneers (Quinn 2013) but was not performed systematically in archaeological research until 1942, when Anna O. Shepard published her study on Rio Grande glaze paint ware (Shepard 1942) and Wayne Felts published his research on Troy ceramics (Felts 1942). In later decades, after these two fundamental works and the rise of processual archaeology as a new theoretical and methodological perspective, thin section ceramic petrography was recognized as a valid scientific approach (Quinn 2013).

In this book, thin section petrography was applied after the classification of the different macrofabric groups and the general identification of the different steps of the operational sequence within those groups. Petrographic analysis was divided in two main components. Firstly, it focused on the petrographic facies, providing the geological context (Roux 2016); second, it concentrated on the classification of techno-petrographic groups within these petrographic facies. As a result, the relationships between geological context—petrographic facies—and technological choices—techno-petrographic groups—was observed. In this respect, petrography works as a tool for supporting or discarding certain hypotheses based on macrofabric and macrotrace grouping. Also, it can aid in reformulating these questions or generating new ones.

Handling of samples

Samples chosen for mineralogical characterization were hydrated with water and then cut with a diamond-tipped saw in a vertical orientation, following the original position of the artifact, so more information on fashioning and pre-forming techniques can be gathered (Quinn 2013).[74] The result was a ceramic chip of at least 3 cm long and weighing 5 grams that was sent to the Miekina Geotechnical laboratory located in Krakow, Poland. There, samples were impregnated with an epoxy resin mix, grounded, and attached to a glass microscope slide, where the majority of the ceramic chip was cut out.[75] Later, the thin section was polished to 30 µm and labeled with a contextual code. Sections were stored in a plastic box specially designed for this purpose, to ensure their durability and potential re-use in further research.

Equipment employed in thin section analysis consisted of two different polarizing light microscopes (LEICA, models DM2700P and DM750P), as well as specialized software for digital image analysis (provided by LEICA). Additionally, reference manuals were used for the identification of minerals in thin section (MacKenzie & Adams 2017). Also, for comparative reasons, other thin section collections were consulted at the Laboratory for Artefact Studies at the Faculty of Archaeology, Leiden University, which were made available by Dr. Dennis Braekmans. Moreover, Dr. P. Quinn from the Institute of Archaeology, University College, London, granted access to thin section slides from other regions of the world with comparable geological fingerprints.

Mineralogical descriptions

For the mineralogical descriptions, this study adopted the descriptive systems developed by D. Peacock (1977), I. Whitbread (1986), and P. Quinn (2013), in combination with Braekmans and Degryse's suggestions (Degryse & Braekmans 2017). The first step in the analysis consisted of visual classification and description, which lead to an initial grouping. This was achieved by a rapid check of the thin sections at low magnifications (x25 and x40) in both XP and PPL and sorting in fabric clusters, and then

74 Some samples were cut horizontally or tangentially in order to observe the pre-forming techniques from different perspectives.

75 The remainder of the chip was kept for future geochemical characterization.

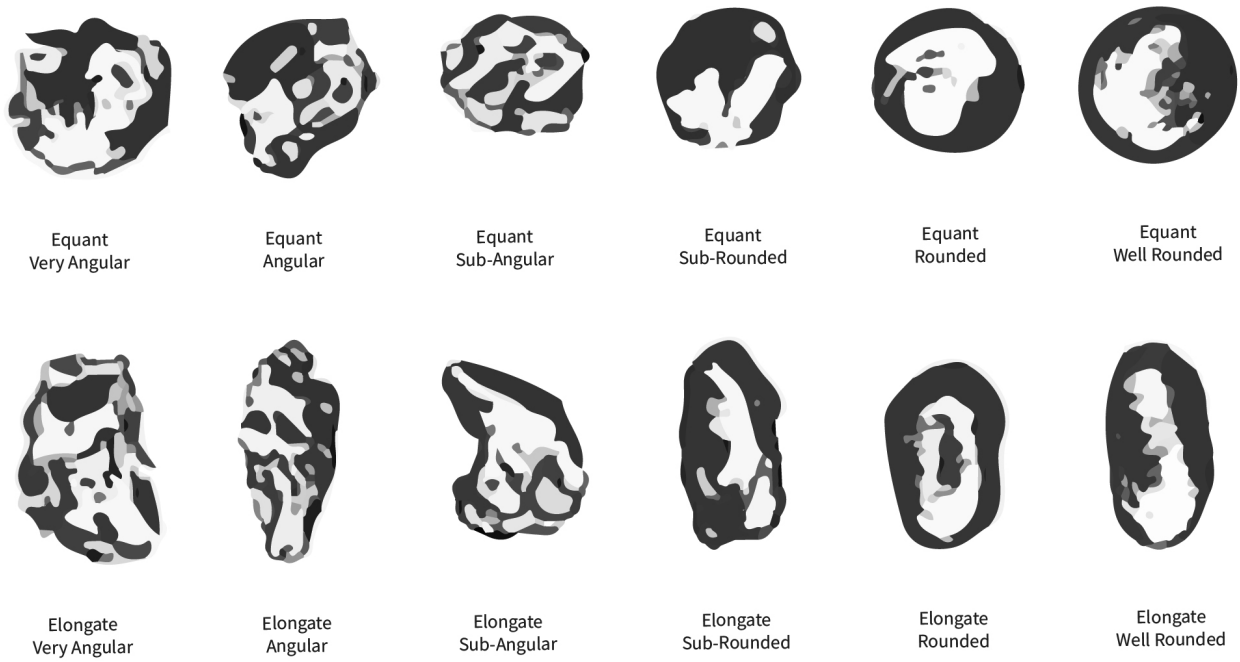

Figure 94: Chart for classifying inclusion shapes (redrawn from Quinn 2013, 84).

by increasing the magnification and separating groups and classes, or subcategories (Quinn 2013). The three main elements observed and described in thin sections are the clay matrix, which is the "(...) the dominant, seemingly amorphous brown material" (Quinn 2013, 39); voids, which are pores; and inclusions, which represent the coarse fraction of the fabric (Peterson 2009). The distribution, orientation, identification, shape, texture, and other features of these three main elements aided in the creation of fabric families, groups, and subgroups. Before going into detail in the three main sections of the analysis, it was important to measure the relative abundance of each in relationship to each other, which was calculated by subtracting the estimated proportions of each in relationship to the others from 100% (Quinn 2013).

Inclusions

First, the percentage of inclusions was estimated according to visual charts and characterized as predominant (>70%), dominant (50-70%), frequent (30-50%), common (15-30%, few (5-15%), very few (2-5%), rare (0.5-2%), and very rare (<0.5%) (Kemp 1985). Then, size was measured, and shapes were recorded (equant or elongated, see **figure 94**). Later, the angularity of these shapes was established through the application of a comparative chart that classifies them as very angular, angular, subangular, subrounded, rounded, and well rounded (Pettijohn 1975). Afterwards, packing was determined as close-spaced when inclusions were in contact; single-spaced when a mean diameter was applicable; double-spaced; or open-spaced. Also, orientation was classified as weak, moderate, strong, very strong (relative to the degree of its parallelism in relationship to the vessel walls), subparallel, or concentric (relic coils). Sorting degrees were especially important to understand the presence or absence of temper and were described as well, moderately, poorly, or very poorly sorted (**see figure 90**). According to this classification, grain size distribution was characterized as unimodal, weakly bimodal, moderately bimodal, strongly bimodal, or trimodal (Whitbread 1986; Quinn 2013).

Voids

Porosity of the clay matrix was recorded using estimation charts and is important for assessing technological choices. Sizes of voids were classified as micro (<0.05 mm), meso (0.05 mm-0.5 mm), macro (0.5-2 mm), and mega (>2 mm). Void

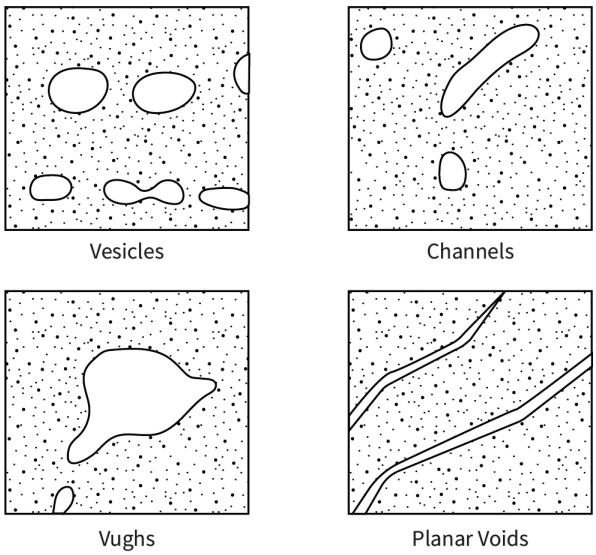

Figure 95: Visual diagram to identify and differentiate vesicles, channels, vughs, and planar voids (redrawn from Quinn 2013, 98).

shapes were recorded using soil micromorphology terminology, so vesicles were characterized as equant, spherical, planar and channel (sometimes grouped as elongated), or vughs (**figure 95**). The degree of alignment of elongated voids was recorded as random or preferred. Additionally, the orientation relative to the vessel wall was observed because it also yields information on fashioning and pre-forming techniques. Voids might be the result of fashioning (center or junctions of coils, for example), firing technology (destruction of organic matter, bloating), and/or post-depositional processes (dissolution of carbonate inclusions or calcite deposits, for instance) (Whitbread 1986; Quinn 2013), so these interpretations were recorded when possible.

Clay matrix

Since the clay matrix itself comprises clay minerals and extremely small inclusions (<0.01 mm), the petrographic information that can be obtained from its examination is limited. However, interpreting raw materials, technological choices and fabric characterization has a lot of potential (Quinn 2013).

The procedure for describing the clay matrix began by assessing the presence/absence and abundance of calcite and iron. Then, color was recorded to examine the clay mineral composition as well as firing technology. Descriptions related to the clay matrix heterogeneity or homogeneity (slight, moderate, high) were relevant for later interpretations related to clay recipes (clay mixing, tempering, raw materials, etc.) Since the matrix's optical activity yields information on firing technology, specifically indicating vitrification processes, it was recorded as slight, moderate, or high in different sections of the slide. Finally, the orientation of the clay domains was recorded for later interpretations of fashioning and pre-forming techniques (Whitbread 1986; Quinn 2013).

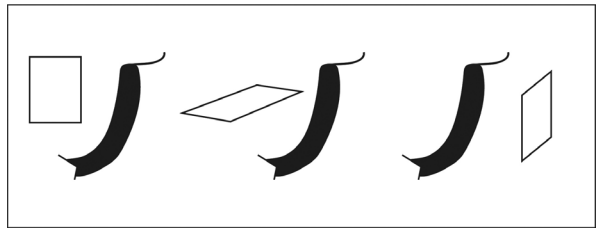

Figure 96: Orientation of the sample in relationship to the vessel shape (redrawn from Whitbread 1996).

Technological choices studied through thin section petrography

In order to make any interpretations about ceramic manufacture through thin section petrography, it was first important to establish the orientation of the sample in relationship to the vessel or sherd. This orientation was classified as vertical, horizontal, tangential, or unknown (see **figure 96**) (Whitbread 1986; Quinn 2013).

Then, the inclusions were described in greater detail, taking into account five main characteristics (**figure 97**). First, the boundaries between the inclusion and the fabric matrix, which were classified as sharp, clear, diffuse, or sharp-to-merging. Second, roundness, which could be angular to well rounded (such as argillaceous rock fragments, ARF), angular to subrounded (for example, grogs), or rounded to well rounded (such as pellets). Third, shape was defined as prolate and conchoidal, prolate and equant, or equant and distorted. As a fourth step, optical density was classified as high, neutral, or low, depending on the visual contrast between the fabric and the inclusions. Finally, features were identified as either concordant or discordant (Whitbread 1986; Quinn 2013). These deeper characterizations aided the identification of temper and clay mixing(s), as well as fashioning and pre-forming techniques.

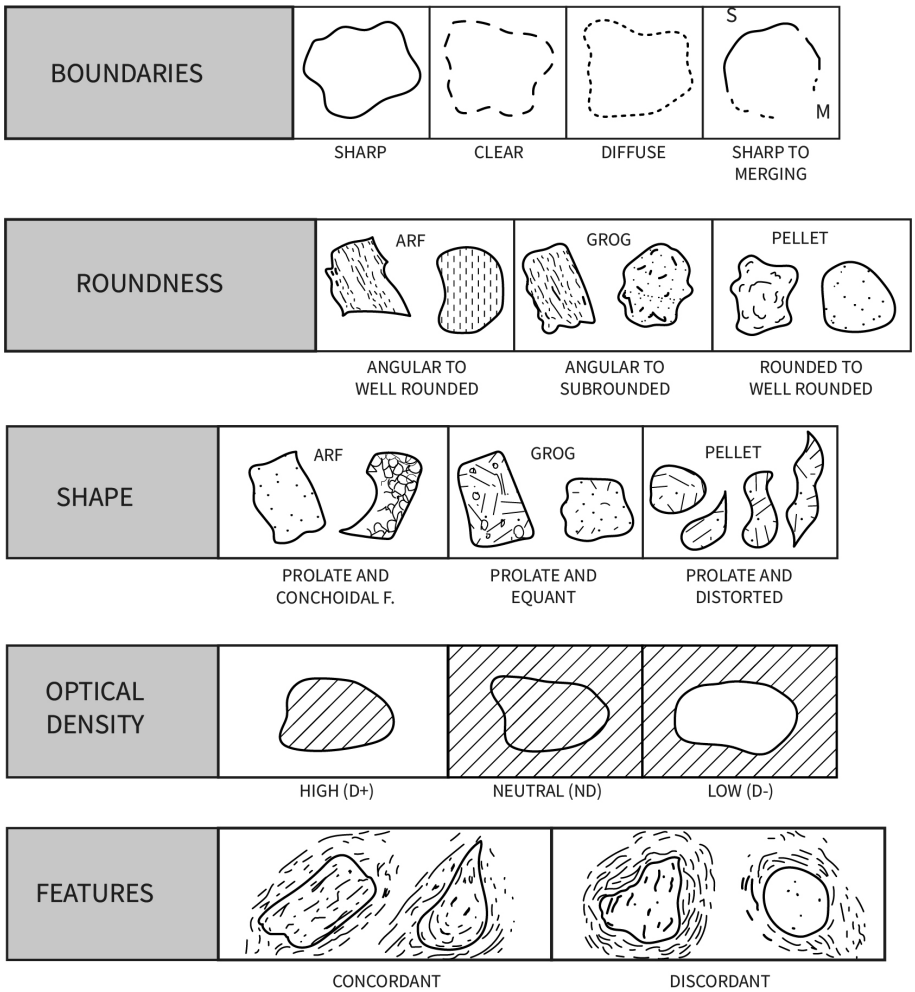

Figure 97: Visual charts for classifying boundaries, roundness, shape, optical density, and features of inclusions (redrawn from Whitbread 1986, 80, table 1).

	Vertical	Horizontal	Tangential
Wheel-thrown	Poor to strong	Strong, parallel to wall	Strong
Clay mass	Strong at wall Poor at center	Strong in center Strong at wall	Poor in center
Slab	Strong (possible angle to horizontal)	Poor	Poor
Coil	Poor or strong	Strong, parallel to wall	Strong, horizontally aligned

Table 20: Different types of orientations for inclusions helpful to infer forming techniques.

In fact, one way to better distinguish these techniques was through the detailed description of the preferred orientation of inclusions, voids, and clay minerals. The different types of orientations (vertical, horizontal, tangential, see **table 20**) differed in degree according to their forming techniques (Whitbread 1986; Quinn 2013).

It was also important to outline the granularity, or position of the grains, which is described by Roux (2016) for macroscopic analysis of technological traces but has not been explored for thin section characterization. When surfaces were well preserved, the grains were characterized as highlighted (uncovered or covered with a fine layer of clay),

"floating" grains, inserted, or negative. The application of these observations in thin section petrography has proven to be a suitable complement for macroscopic analysis, allowing observations in thin section that are not possible with a stereomicroscope on the surface of the sherds.

Also, surface treatment and decoration techniques were described when visible, as well as the presence or absence of post-depositional processes, such as layers of micritic calcite on the surface or deposits on voids.

Finally, for identifying firing techniques, two variables were recorded. First, the optical activity/inactivity of the clay matrix (Whitbread 1986), which is related to firing temperature. Second, the colors observed on the surface and within the core were described to reconstruct firing conditions following the characterizations proposed by Rice (2005, 345), which take into account surface and core colors and relate them to probable firing atmospheres.

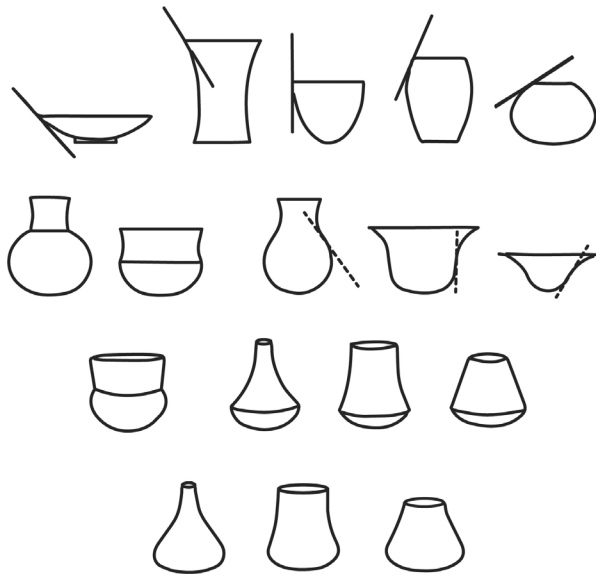

Figure 98: Visual chart to establish restricted and unrestricted vessel shapes (redrawn from Shepard 1985, 229).

6.5 MORPHO-STYLISTIC GROUPS

Traditional pottery classifications usually organize their groupings according to morphological types and decorative attributes (Norweb 1961; Baudez 1967; Healy 1980; Gorin 1990). However, this study followed a technological approach (Roux 2016) and left morphostylistic classification until the end of the analysis. Studying macrofabrics, then technological gestures, and later characterizing the composition of ceramics through thin section petrography allows for the identification of the different steps of the *chaînes opératoires*, as well as their variability. Only then it is valuable to include the end products, the particular intentions of the potter. In turn, this examination helps to "*(...) évaluer si la variabilité des chaînes opératoires est liée aux catégories fonctionnelles présentes au sein de l'assemblage ou à la présence de plusieurs groupes sociaux*" (Roux 2016, 267).

Also, morphostylistic analysis is of extreme importance in order to create correlations between the multiple analytical groupings outlined in this study and the current available data on pottery throughout Nicaragua and the entire Isthmo-Colombian area. Without this step of the analysis, the study would not only lack the connection with the actual end product which was conceptualized before undertaking the manufacturing sequences, but also a comparative baseline with previous research in the area (Magnus 1976; Gorin 1990) as well as other regions in Nicaragua, Honduras, and Costa Rica. Additionally, as outlined in Chapter 3, a ceramic study that intends to reconstruct practices would be seriously flawed if it did not include anything about one of the main sections of a pot's biography, its "life" as a vessel within the community. Exacerbated stress on attributes, macrotraces, mineralogical or chemical characterization only results in very partial views of pottery.[76]

6.5.1 SAMPLING FOR MORPHO-STYLISTIC GROUPS

All rim sherds, bases, and appendages, both decorated and undecorated, were drawn, photographed and measured, and a database was created especially for recording them. The variables taken into account included type of vessel (unrestricted, restricted, or unidentified), shape (see below), wall angle, base angle, diameter, percentage of the vessel, rim profile, rim angle, and lip morphology.

6.5.2 ANALYTICAL STEPS

Shape classification

Pottery manuals (Shepard 1985; Orton *et al.* 1993; Rice 2005; Orton & Hughes 2013) were followed for

76 See Chapter 3 for a complete discussion.

Code	Shape
C	bowl
CR	straight walled bowl
CRD	outflaring straight walled bowl
CC	curved bowl
CCC	convergent curved bowl
CCD	divergent curved bowl
CRC	convergent straight walled bowl
O	olla, jar, or cooking pot
P	plate
CML	griddle
ML	*molcajete*
T	neckless jar

Table 21: Codes used for vessel shape characterization.

the classification of shapes within each macrofabric group. Complete profiles were taken into account and classified according to geometric shapes rather than functional categories (**figure 98**), to avoid conflating description and interpretation (Daneels 1988; 1996; 2002; Roux 2016).
When possible, specific shape identification was conducted following the coding system developed by Donner and Hernández Arana (2018), which is mainly based on Daneels (1988; 1996; 2002). **Table 21** summarizes the generalized shapes and their respective codes used in this research.

Classification of decoration
The localization, general structure and "grammar" of the decorations (Roux 2016) was described following classical procedures for analyzing archaeological pottery decoration (Shepard 1985; Rice 2005; Orton & Hughes 2013). Decorated sherds were photographed and quantified depending on the techniques applied: incisions, punctuation, appliqué (annotation in case of zoomorphic or anthropomorphic ones), paint, double slips, corrugated surfaces, or impressions. Colors and part of vessel that was decorated were recorded as well, taking into account their contextual and macrofabric classifications.

6.6 INTEGRATION OF APPROACHES

The final stage of this analytical strategy consisted in the creation of a database integrating all the relevant aspects related to the different steps of the production process. This database included macrofabric code, stratigraphic information, vessel part, shape (when identification was possible), diameter (for rim sherds and bases), wall thickness, macrofabric assessment, petrographic group, texture, coil measurement (in cm), size of the lip coil in relationship to body coils, position of the lip coil, the identification of coils as equidistant or not, position of the coils, pre-forming hypothesis, grain position in relationship to the surface, striations, hygronomic state for finishing, surface treatment, firing temperature, context (off-mound or on-mound), and comments. These variables were combined to propose the reconstruction of the main production sequences for each assemblage analyzed, from clay procurement and paste preparation practices through firing and decorative techniques.

6.7 DATING TECHNIQUES

As the main objective of this study consists of establishing the spatiotemporal relationships between the different pottery manufacturing traditions, different materials were tested for absolute dating. Relative dating was performed mainly through the integration of stratigraphic data with the ceramic analysis, together with a comparative examination of the different technological steps between assemblages determined as synchronic or diachronic through absolute dating techniques.

6.7.1 ABSOLUTE DATING

In this study, absolute dating techniques consisted of accelerator mass spectrometry radiocarbon dating (C14-AMS) of different kinds of materials, such as charcoal, organic sediment, zooarchaeological remains, charred encrustations deposited in the internal surfaces of sherds, and a charred seed. Except for organic sediment dating, sampling strategies were based on the randomness of evidence, meaning that collections were only possible when adequate samples were retrieved during the excavations. In contrast, sampling for bulk sediment dating was based on detailed stratigraphic analysis, meaning that it allowed for the selection of specific features and stratigraphic units based on their depositional history and co-occurrence of other materials. As a result, the combination of diverse methodologies and different laboratory facilities granted reliability in the process of building a solid chronology.

Sampling strategy

Samples for C14-AMS dating were collected in every stratigraphic unit that presented them, with no exceptions. For their preservation and to avoid contamination, samples were wrapped in aluminum foil and then stored in Ziploc bags with their correspondent tags. Once at the lab, they were placed in plastic boxes for preservation. Zooarchaeological and botanical samples were selected by specialists after analytical procedures, as in the case of the charred encrustations on pottery sherds.

Samples for bulk organic sediment dating were collected in two different moments. In the case of features, samples were retrieved during excavation. Also, at the end of the excavations, specific stratigraphic units were selected for sampling in accordance with their stratigraphic position and characteristics.

Collections were done following the guidelines established for luminescence sampling (Nelson *et al.* 2015), with a few suggestions made by J. Pagán Jiménez (pers. comm. 2016). Equipment utilized consisted of a *machete*, rubber mallet, 7.62 cm wide 15cm long PVC tubes, PVC lids for vacuum seal, aluminum foil tape, distilled water for cleaning the tools and containers, and Ziploc bags. First, the *machete* was cleaned with distilled water and then used to clear the surface from which the sample was to be taken from. Then, the strongest lid was placed on one of the PVC tubes, which penetrated the surface by percussion with the rubber mallet (**figure 99**). When at least half of the tube was full, the second lid was placed. The tube was then wrapped in aluminum foil tape, labeled with its stratigraphic context (site, excavation unit, stratigraphic unit, level, and sample number), and finally stored in a Ziploc bag. During the rest of the fieldwork day, samples were placed in the shade, and once at the lab, they were securely stored in a fridge until they were exported.

Organic sediment dating

Bulk organic sediment dating was conducted by Beta Analytics lab, located in Miami, FL, USA. Once at the lab, sediment pretreatment involved soaking in warm water for a period of time before sieving through a 180 µm sieve to remove roots and macrofossils. The material that passed through the sieve, which is considered as the bulk sediment, was then kept for analysis. Later, dilute hydrochloric acid was applied for the removal of carbonate. Then, the filtrate was rinsed with deionized water and dried in an oven. If macrofossils (plant, charcoal, shell, etc.) were found in the sample, they were collected in the sieve. Finally, AMS dating was applied to the bulk sediment remaining from this process. Additionally, the laboratory provided the C13 isotope amount for each sample, which yielded information on paleoenvironment.

Figure 99: Sampling for organic sediment dating at Barillas, excavation unit 1 (EUBI1).

AMS carbon dating

AMS carbon dating of charcoal samples took place at Beta Analytics lab, and zooarchaeological samples, charred residues on sherds, and charcoal were measured at the Keck-Carbon Cycle AMS facility at University of California, Irvine (USA). Finally, the charred seed sample was analyzed at Poznań Radiocarbon Laboratory (Poland). Carbon-14, a weak radioactive isotope of Carbon, was first measured, and then radiocarbon age results were calibrated to calendar years with OxCal v4.3.2.2 (Bronk Ramsey 2017) using the IntCal13 curve (Reimer *et al.* 2013) and CalPal online employing the CalPal_2007_HULU curve, Bomb13NH2 Curve (Bomb13NH2.14c), and post-bomb atmospheric NH2 curve (Hua *et al.* 2013).

6.7.2 RELATIVE DATING

Stratigraphic analysis, in combination with absolute dating, provides an overview of the life cycle of each site studied in this manuscript. As outlined in Chapter 3, ceramic chronologies can be based on two different principles. On the one hand, they can involve the calculation of relative frequencies of different ceramic groups by stratigraphic units,

excavation units, sites, or sets of sites. On the other hand, non-metric multidimensional scaling can be applied through the analysis of group co-occurrence (Sinopoli 1991). These approaches, as well as seriation and cross-dating (Rice 2005), are usually undertaken. In contrast, this research, based on the premises outlined in Chapter 3, only used comparisons of co-occurrence (of technical choices) to aid in the chrono-narrative, and these variables were not circumscribed to time boxes because the trajectories of their itineraries cannot be reduced to a Cartesian chart.

7 Ceramic technologies in the valley of Juigalpa

This chapter embarks on a journey to explore the different trajectories involved in ceramic manufacture, which serves as the fundamental—yet not exclusive—interweaving thread of the chronological narrative in Chapter 8. Ceramic production is reviewed from a technological perspective, taking into account the socially learnt recipes, gestures, the universes of possibilities, of certain "do's and don'ts" of different dwellers in the valley of Juigalpa. These itineraries intersect with landscape relationships, human mobility, social organization, household perceptions, and many other factors that remind us that pots are a developing part of human vibrant lives. Like people (but not *as* people), ceramics are palimpsests of intertwined trajectories that involve continuity and change. Therefore, microhistories of technical traditions are necessary in order to understand the lives—and sometimes also the deaths—of people beyond morphological and aesthetical appreciations, including the vitality of materiality, viewed as embodied practices.

To reconstruct these microhistories, this section will provide an overview of the results of my ceramic analysis, which aimed to reconstruct situated production choices from clay procurement through paste preparation, fashioning, finishing, surface treatment, decoration, and firing techniques, as well as some insights into consumption. Therefore, the results are grouped according to archaeological site (Aguas Buenas, Alberto Obando, Barillas, Oporta, Josefa Ocón Robleto, Rosa Dolores Oporta, and La Aventura). Each section starts with a general description of the ceramic assemblage, followed by the results from the different analytical approaches included in this ceramic research: macrofabric, petrographic, technological, morphostylistic, and decorative characterization. Finally, the reconstruction of proposed operational sequences for ceramic manufacture is provided, discussing their variability and connections.

From the 30178 sherds that were quantified, measured, weighed, and preliminarily classified according to vessel type, and after several sampling procedures (see Chapter 6), a total of 3710 sherds were analyzed and classified in macrofabric groups, and then 167 were sampled for petrographic analysis and thorough macrotrace characterization. A stylistic examination was conducted of all rim and base sherds, as well as of 100.0% of the decorated samples. All of the ceramic fragments included in this dataset were excavated, washed, labeled, sampled, and analyzed in a team-based approach, under my supervision and coordination. The petrographic analysis was conducted by Simone Casale, who provided key insights into mineralogical and technological aspects of the samples.

7.1 ALBERTO OBANDO

The two excavation units placed at the Alberto Obando site yielded 875 ceramic fragments (3498.1 grams). In general, fragments were small, with an average length of 29.0 mm; 82.0% of the sherds were smaller than the average, while 18.0% were larger. Sherds were extremely homogeneous in wall thickness, with all fragments—except for two—measuring between 4.0 and 7.0 mm wide. Therefore, unlike other sites, only one group was created in relationship to wall thickness. Moreover, 74.0% of the sherds corresponded to unrestricted vessels, 16.0% to restricted vessels, and the remaining 10.0% to undetermined shapes. The assemblage features several vessel parts, such as rims, rim/necks, shoulders, shoulder/necks, bodies, bases, handles, lugs, and supports. Decorating techniques included double slips, incisions and appliqués (geometric, zoomorphic, and possibly anthropomorphic), as well as one *acanaladura* example. Additionally, a seal fragment was documented featuring an inverted Z inscribed with a wide tool (**figure 100**).

Figure 100: Seal fragment retrieved from excavation unit Alberto Obando 1 (EAO1) featuring a "Z" shaped motif.

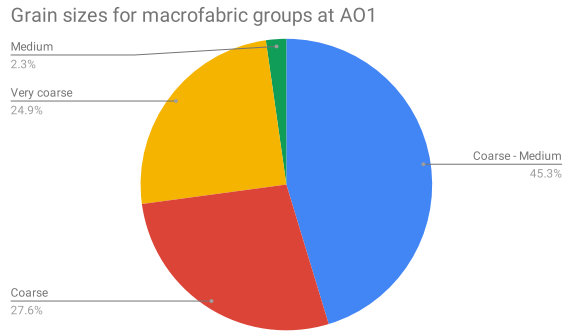

Figure 101: Distribution of the different textures identified in the macrofabric groups of EAO1.

Fragmentation was high, and sherds typically featured subrounded edges, two characteristics that, when combined, indicate trampling and erosion. In particular, the excavation unit 1 (EAO1) sample was one of the most eroded of the entire analyzed assemblage. Fragments were of trapezoidal, triangular, and quadrangular shapes, which are typical for the fashioning of assembled elements, in particular the coiling technique. Also, sherds were very powdery and soft, with light colors (salmon, orange, light brown), and breakable by applying a minimal pressure with the fingers. Moreover, fragments featured fire marks visible both on the inside and outside surfaces, possibly related to use-alteration. Firing possibly took place in an oxidizing atmosphere at very low temperatures (<750 °C). A total of 281 sherds (1855.9 grams) were sampled from excavation unit AO1 for further analysis.

7.1.1 PASTE ANALYSIS

Macrofabric groups

The analyzed assemblage was classified into six different macrofabric groups that formed homogeneous ceramic series in their composition. The same clay recipes, which span from very coarse to medium, were mainly composed of rounded clay pellets, feldspars, and ores combined with subangular quartz and dark micas. The groups were created according to differential grain size and frequencies. Groups featuring very coarse grains amounted to 24.9%, those containing coarse grains comprised 27.6%, and coarse-medium made up 45.3%, while medium was represented by 2.3% (**figure 101**). Therefore, the samples were characterized as mainly coarse, with minimum amounts of medium sherds and a complete absence of fine-grained vessels. Frequency of inclusions varied from 20.0 to 30.0% for most of the groups, except for one. Subangular to rounded inclusions were common in the assemblage, with a clear tendency towards low sphericity, with quartz crystals as an exception. The orientation of the inclusions was usually concentric and chaotic, which is consistent with the coiling technique for preforming vessels. Voids were generally of a plate-like and oval-sphere shape, and their orientation was highly variable. Regarding firing technology, variability in the core-margin relationship as well as cross-section and surface Munsell colors suggest different temperatures, duration of firing, and position of the vessel (or vessel part) in relationship to the fuel source. These variables explain the range from complete oxidation to different varieties of incomplete oxidation. Fire marks due to production were not identified, while carbonization in internal surfaces, derived from use-alteration, was common. Since a kiln structure was not identified and the site lacked areas with high surface ceramic densities, production—if it was indeed conducted within the site—possibly took place at very low intensities, and firing might have been undertaken without the use of kilns but avoiding contact between the flames, the fuel, and the pots.

Petrographic Groups

The 23 samples examined through a polarizing light microscope were classified into three petrographic groups and two subgroups, while two sherds were

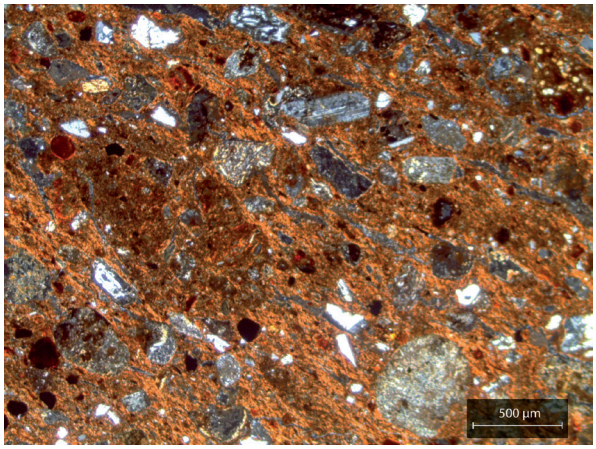

Figure 102: Example of a typical fabric for petrographic Group 1. Sample AO1.5.12 was photographed in XP (credit: Simone Casale).

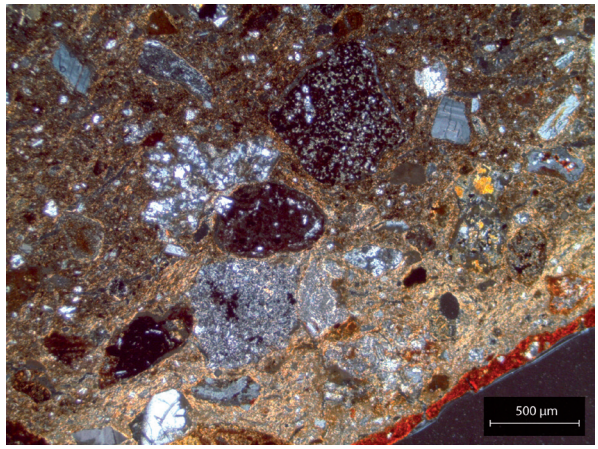

Figure 103: Example of petrographic Subgroup 1A, featuring coarse inclusions of granite, chert, and clay pellets. Sample AO1.6.5 was photographed in XP (credit: Simone Casale).

identified as outliers, since their main characteristics did not match any of the groups (Casale *et al.* 2019). Observations under the petrographic microscope matched the ones undertaken during macrofabric analysis: paste groups are homogenous in their intermediate volcanic composition. The geology is mainly granite and andesite as well as unidentified weathered volcanic rock but also contains the presence of basalts and minerals such as quartz, feldspars, olivine, ortho and clinopyroxene. Variation in clay recipes resided in differences related to grain size and frequency of inclusions, as well as firing temperature and duration. In comparison to other sites, the assemblage excavated at AO1 shows very high homogeneity in clay procurement choices and moderate variability in clay preparation and firing practices.

In general, the assemblage analyzed was defined by granule to medium inclusions of extrusive intermediate igneous rocks (100-3000 µm), mainly identified as granite, andesite, and basalt. Accessory minerals consisted of pyroxene (both ortho and clino, 200-500 µm), augite (150-500 µm), quartz (50-650 µm), plagioclase feldspars (100-600 µm), olivine (50-600 µm), volcanic ash and glass (200-600 µm), and iron-rich inclusions (100-500 µm). Voids were present (50-250 µm) in mostly elongated shape and exhibited variability in their orientation (to the walls, around coils, or coarser inclusions). **Group 1** (**figure 102**) is the main cluster of Alberto Obando, containing nine of the samples examined for petrography, and is interpreted as a local clay source due to its strong connections with the Güegüestepe ethnographic sample (see below). The group is characterized by an iron-rich matrix with fine to coarse inclusions (200-600 µm) and some isolated very coarse grains (1000-2000 µm). Inclusions are mainly comprised of clay pellets and intermediate volcanic rocks, mostly represented by granite and andesite, with rare basalt (200-1200 µm). Weathered volcanic rock inclusions are also present and might be related to weathering processes associated to riverine clay deposits. Other common inclusions within this group are iron-rich fragments (100-500 µm), quartz (50-500 µm), feldspars (plagioclase and sanidine), volcanic ash and glass (200-600 µm), and olivine (100-400 µm). Voids display an elongated shape (150-250 µm) and are either not oriented or moderately oriented to the borders or to coils. As all matrices are optically active, firing most likely took place at temperatures lower than 750 °C, in a completely oxidizing atmosphere. Some samples within the groups have differences in frequency (AO1.6.7) or grain size (AO1.6.S2) but share the same mineralogical and technological profiles, so their variability is considered within the group.

Petrographic Group 1 yielded two subgroups: 1A and 1B. **Subgroup 1A** is characterized by a very similar composition to the main cluster, featuring a high frequency of coarse volcanic rock inclusions, mainly comprised of granite, andesite, and weathered fragments (**figure 103**), with a rare occurrence of

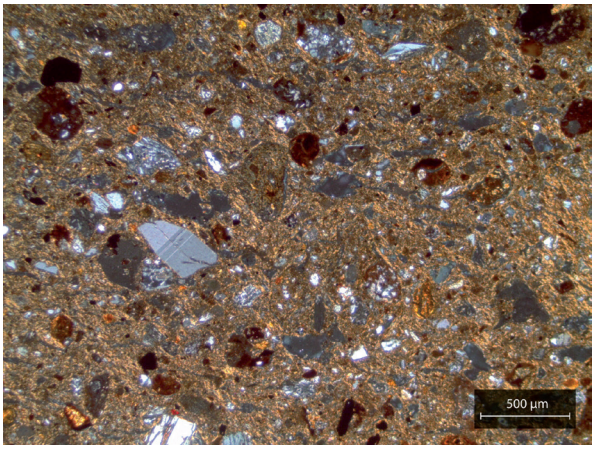

Figure 104: Example of petrographic Subgroup 1B. Sample AO1.5.3 was photographed in XP (credit: Simone Casale).

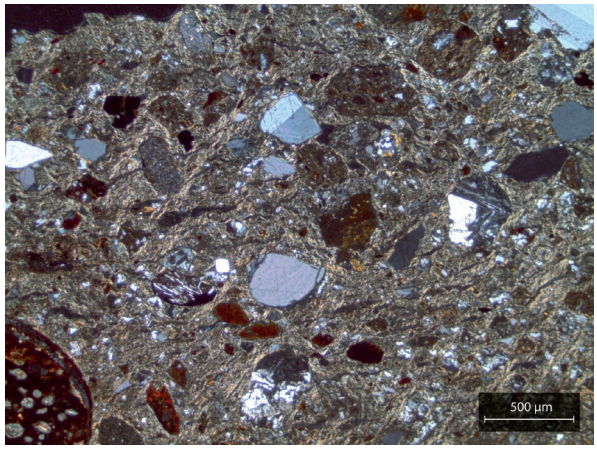

Figure 105: Example of petrographic Group 2, featuring andesite, sanidine, chert and clay pellets inclusions. Sample AO1.5.2 was photographed in XP (credit: Simone Casale).

basalt—except for sample AO1.5.4, which contains higher frequencies of basalt. The main difference between Group 1 and Subgroup 1A is in the size of inclusions; while Group 1 usually ranges between 200 and 600 µm, Subgroup 1A averages 500 to 800 µm, and smaller fragments (<300 µm) are rare. This could suggest sieving practices or selection of a clay outcrop with slightly less transport and erosion. Also, orthopyroxene and augite (100-600 µm), as well as angular and subangular K-feldspars and plagioclase (100-600 µm), are present. Elongated voids (50-250 µm) were usually found around coarser inclusions, with no orientation in relationship to the walls.

Subgroup 1B is also very similar to Group 1 and Subgroup 1A in composition, but most of the inclusions are finer, between 50 and 100 µm with a few measuring 300 to 500 µm (**figure 104**). Therefore, sieving and sorting practices can be deduced. Additionally, sample AO1.11.1 yielded high frequencies of fine quartz inclusions (100-200 µm), which were interpreted as temper.[77] Elongated vughs and vesicles (50-150 µm) were moderately oriented to not oriented to vessel walls.

Group 2 contrasts with Group 1 in three main ways. First, it features a lower density of volcanic rock inclusions, such as granite, andesite, and weathered fragments. Second, the matrix seems to either contain less iron than Group 1, or differential firing conditions (a shorter time) could have stopped the complete oxidation of iron, resulting in a lighter matrix color (**figure 105**) (L. Jacobs, pers. comm. 2017). Third, quartz and feldspars (300-1000 µm), sometimes featuring angular and subangular edges, are most common within Group 2, suggesting tempering practices (**figure 106**). However, according to Casale *et al.* (2019), the high frequency

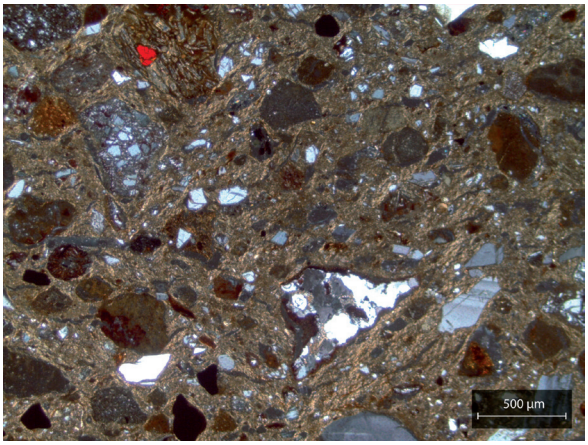

Figure 106: Subangular inclusions (i.e. granite) in petrographic Group 2. Sample AO1.6.1 was photographed in XP (credit: Simone Casale).

77 This hypothesis was strengthened by macroscopic analysis, in which fire marks associated with cooking practices were identified. Quartz tempering of cooking vessels might have been a functional choice related to heat transfer and thermal shock.

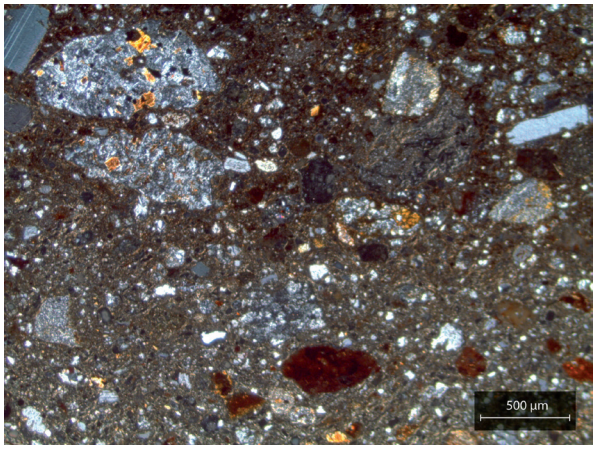

Figure 107: Petrographic Group 3 featuring granite, clay pellets, chert, and quartz inclusions. Sample AO1.6.4 was photographed in XP (credit: Simone Casale).

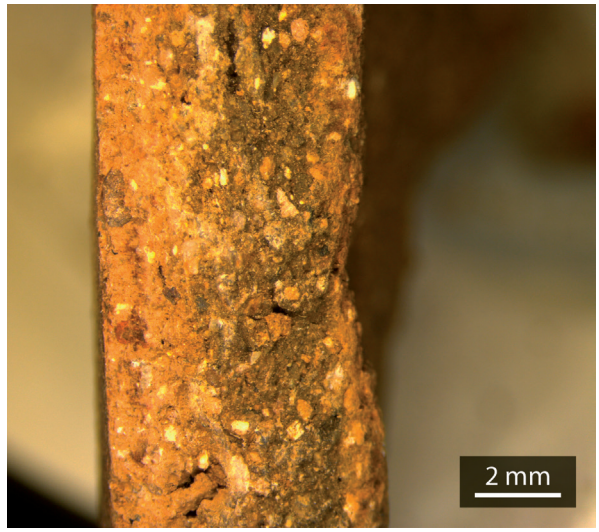

Figure 108: Cross-section from the ceramic assemblage EAO1 featuring coils.

of fine quartz and feldspar inclusions, together with the occurrence of some coarser granite grains, might suggest a clay outcrop related to a weathering granite parent material instead. Therefore, it is not clear if the differences between the groups are related to clay procurement or preparation practices. Either way, both their mineralogical and technological profiles support the classification of these samples into a different cluster. Within Group 2, voids with an elongated shape were oriented to the borders and measured between 100 and 200 µm; also, some large cracks (600-3000 µm) were visible.

Group 3 is characterized by a matrix featuring less iron content or a shorter firing duration, as in the previous cluster. However, the distinctive characteristic of the group lies in the high frequency of angular to subrounded granite inclusions, featuring a wide range of grain sizes (200-2000 µm), accompanied by angular to subrounded quartz inclusions (100-600 µm) (**figure 107**). This could be the result of a clay outcrop with granite parent materials, but it does not necessarily discard the intentional addition of freshly ground rock fragments from the same geological background as temper. Elongated voids (100-200 µm) were not oriented to the walls. Outliers featured similar mineralogical profiles as the samples that were grouped; however, certain distinctive characteristics prevented them from fitting into the classified clusters.

7.1.2 MACROTRACES OF MANUFACTURING PRACTICES

A general overview of the assemblage suggested preforming through assembled elements mainly due to the shape of the fragments, the orientation of inclusions, and irregular surface topography of the sherds—which feature marks of discontinuous pressure as well as different wall widths—all traits that support coiling as the main fashioning technique. Then, even though the general first impression of the assemblage suggested a preference for leather hard clay for working from preforming through surface treatment—evinced by the occurrence of inserted grains, for example—it is possible that traces of earlier steps were erased by later gestures. However, after macroscopic inspection of the different macrofabric groups, data pointed to wet clay preforming followed by leather hard clay surface treatment. In particular, wet clay preforming and finishing implied the use of a dry tool (fingers, calabash, or ceramic tool are feasible options) that left thin-threaded striations (gestures were usually parallel to the vessel mouth), combined with protuberant grains. Surface treatment involved smoothing on leather hard clay with a soft tool and burnishing, which did not leave any visible marks on the surface. Apart from that, coating with clayish slips was applied.

The 23 samples submitted to petrographic characterization were also thoroughly examined

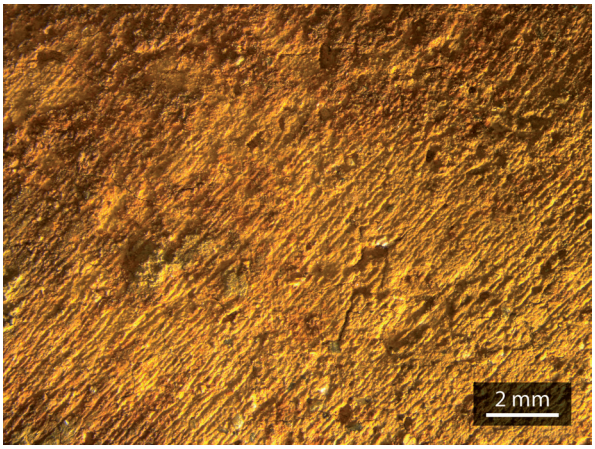

Figure 109: Sample AO1.5.S1, external surface featuring threaded striations produced by smoothing on leather hard clay with rehydrated fingers.

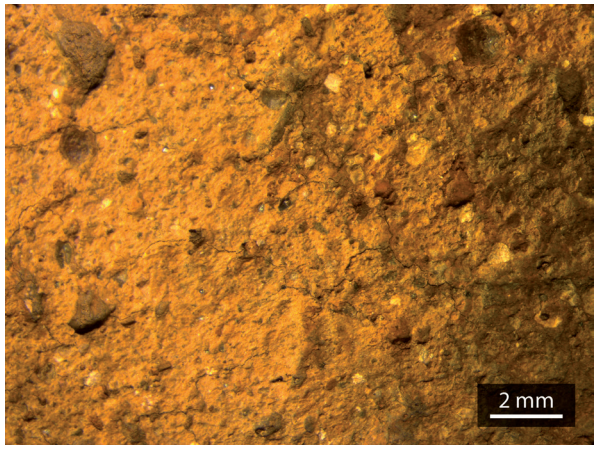

Figure 110: Sample AO1.5.S1, internal surface featuring wet clay surfaces.

for macrotrace identification of manufacturing practices (see **Appendix 8**). All samples featured fashioning through assembled elements (coils), which measured between 5.0 and 10.0 mm wide in 17.0% of the cases (unrestricted shapes, wall width between 3.0 and 5.0 mm) and from 11.0 to 15.0 mm wide in 65.0% of the cases (all unrestricted shapes except for one, wall width between 3.5 and 7.0 mm), while 9.0% ranged between 15.0 and 25.0 mm (unrestricted vessels, wall width 3.5-5.5 mm and a restricted vessel, wall thickness 10.0 mm), and in 9.0% of the cases coil measure was not possible due to the fragmentary nature of the sample. Coils were positioned equidistantly and mainly in an oblique fashion (**figure 108**), either with gestures from the outside to the inside of the vessel (26.0%) or vice versa (26.0%). In 13.0% of the samples, coils were placed in an alternating manner, while in 35.0% of the cases it was not possible to assess this gesture due to the high fragmentation rates in the sample analyzed.

Apart from that, lip coils were positioned either from the outside or inside and were either the same size as body coils or larger. Preforming was carried out through pinching and drawing; finishing was usually done on wet clay with a soft tool, leaving threaded striations in combination with protuberant grains, but four samples (AO1.6.6, AO1.5.S2, AO1.6.2, and AO1.5.S1) show partial evidence of leather hard clay finishing (also referred to as shaving) as well. Sample AO1.5.S1 is of special interest because it features both kinds of finishing: wet clay in the interior and leather hard clay in the exterior (**figures 109** and **110**).

Future experimentation is required to assess this hypothesis because it seems that some traces—particularly threaded striations, present in 90.0% of the samples—are found in combination with both protuberant and inserted grains. Therefore, they might be connected to a specific tool and gestures that, regardless of the hygronomic state of the clay, left similar marks on the surfaces. Therefore, it is also possible that all finishing gestures were performed on wet clay and later leather hard clay work obscured the traces. Indeed, surface treatment involved leather hard clay smoothing, some burnishing, and coating with *barbotine* or slips rich in iron and mica, of generally red, brown, or orange colors, and in very limited cases white (less than ten sherds in the whole sample).

Fragmentation of the sample analyzed did not allow for a full reconstruction of the operational sequences of whole vessels. However, several preferential fractures as well as scars related to assembled elements point to staged fashioning of individual parts of the vessels (i.e. start with the base, continue with the body, add a neck or rim), requiring some drying in between. Also, drying/cooling cracks are present in the sample, which suggests an uneven drying/cooling process.

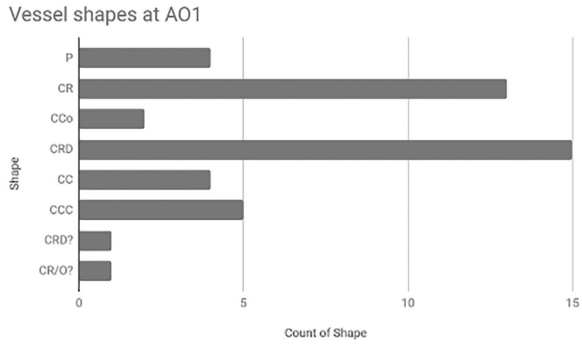

Figure 111: Vessel shapes at EAO1.

7.1.3 MORPHOMETRIC ANALYSIS

Vessel shapes at Alberto Obando were extremely homogeneous, featuring mostly thin-walled unrestricted vessels (70.0%) and sometimes composed silhouettes (see **figure 111**, **Appendixes 6 & 8**). The largest group of forms, unrestricted vessels, was dominated by outflaring straight walled jars (CRD), which measured between 13.0 and 40.0 cm in diameter, with a wall thickness ranging from 4.0 to 7.0 mm. On average, their diameter was 21.0 cm (31.0% <20.0 cm, 63.0% between 20.0 and 25.0 cm and 6.0% >25.0 cm). The next common shape, straight walled jars (CR), featured diameters between 13.0 and 30.0 cm, with wall thickness ranging between 3.5 and 6.0 mm. On average, their diameter was 20.0 cm (43.0% <20.0 cm, 43.0% between 20.0 and 25.0 cm and 14.0% >25.0 cm). Convergent curved jars (CCC) had diameters between 4.0 and 21.0 cm, while their walls ranged between 3.0 and 5.0 mm. Curved jars (CC) yielded diameters between 10.0 and 25.0 cm, and their walls ranged from 3.0 and 5.0 mm. Plates (P) measured between 6.5 and 30.0 cm in diameter, and their walls were 3.0 mm thick; however, one plate measured 40.0 cm diameter and had a 5.0 mm wall thickness. Convergent jars (CCo) yielded diameters between 30.0 and 33.0 cm, and their walls were thin, only 4.5-5.0 mm wide.

One of the most important observations regarding vessel shapes at AO1 is not ubiquity but absence: there are no *olla* fragments among the 281 sherds examined in the sample. This is a very relevant caveat when thinking of cooking and storing practices. Charred remains on the interior of the vessels, combined with a lack of soot on the outside surfaces, point to roasting practices. However, the presence of soot on preferential sections of the outer vessel walls without internal carbonization could suggest boiling as well, with no traces of overboiling (as in JOR, see below). Also, several samples evince possible fermentation traces, represented by differential internal wall erosion that involved the removal of superficial clay layers. Apart from that, sizes of vessels imply both communal and individual ways of serving, storing and cooking, though the sample is too fragmentary to actually infer specific eating habits.

7.1.4 DECORATING TECHNIQUES

Slipped fragments make up of 75.0% of the samples (either external or internal walls, or both). Other decoration practices were almost entirely lacking within the assemblage analyzed—only representing 5.0%—and consisted mainly of double slipping practices, followed by appliqué decoration, incisions, and one *acanaladura*, or corrugated surface. Double slips were by far the most common decorating practice, mainly featuring red-on-white (43.0%), red-on-orange (38.0%), orange-on-white (14.0%) and brown-on-red (5.0%) combinations. Sample AO1.6.S1, a base featuring a mammiform support (2.8 cm diameter, with one 0.6 cm diameter orifice on one of its sides), was also decorated with a triple slip (red-on-orange-on-white), so it is the only polychrome sample within the assemblage, which is largely bichrome. Incisions consisted of parallel thin lines usually below 0.5 mm wide (although one sample has lines between 0.5 and 1.0 mm). They were placed on the outer surfaces, parallel to the mouth of the vessels. Since grains are inserted on the incised sections, it is possible that they were done on leather hard clay. Incisions were usually combined with slipping on other areas of the vessels. Appliqué decoration was scarce; sample AO1.5/AO1.A1 featured red slip and an applied thin coil (3.5 mm wide) on the external wall and parallel to the vessel base, while sample AO1.11 yielded the same technique but with a wider coil (9.0 mm). Sample AO1.6 is a zoomorphic adorno representing a bird (possibly a duck) in combination with red slip (**figure 112**). The rest of the applied decorations actually consist of appendages, such as mammiform supports (n=3), handles (n=2, one cylindrical with 1.3 cm diameter, one is a crushed coil measuring 19.0 by 13.0 mm wide), and lugs (n=1 with oval base and conical tip). Among the handles, it is important to mention sample AO1.5.6, a CCC (possibly *tecomate*) that features the scar of either a lug or handle next to

Figure 112: Zoomorphic adorno (EAO1).

its base, which could be related to the function of the vessel. Finally, sample AO1.6 features a double slip combined with an external *acanaladura* parallel to the vessel mouth.

7.1.5 CERAMIC MANUFACTURING SEQUENCES AT AO

The AO1 sample yielded homogenous results in terms of macrofabric, petrographic, macrotrace analysis, vessel shape, and decorating techniques, so differences in the steps of the operational sequence are minimal. In spite of this, two different production sequences were identified. Based on clay procurement, preparation, and firing practices, a third sequence (corresponding to petrographic Group 3) is possible; however, the fragmentary nature of the evidence (only two samples and one is too small to examine for fashioning) makes it difficult to characterize a whole sequence.

Operational sequence AO-I

This category corresponds with petrographic Group 1 and its subgroups 1A and 1B. While clay procurement practices seem to be similar between the subgroups, clay preparation practices might have diverged. All mineralogical profiles are characterized by a matrix with high iron content, combined with inclusions corresponding to intrusive igneous rocks (granite and andesite, and basalt to a lesser extent). However, the main group does not feature any paste preparation practices, while Subgroups 1A and 1B could have involved differential sieving and/or tempering practices. After paste preparation, coils between 1.0 and 1.5 cm (three exceptions: coils <1.0 cm in Group 1 and Subgroup 1A, as well as coils measuring 2.5 cm on Subgroup 1A) were positioned equidistantly in an oblique manner, either from outside to inside or vice versa. Only one sample (AO16.7) featured alternate coiling placement. Lip coils were positioned either from outside to inside or vice versa and were of the same size or larger than the coils forming the vessel body. Preforming involved pinching and drawing, done in a manner that left the topography of the sherds irregular; finishing was undertaken on wet clay (prominent grains) with a technique that left very fine threaded striations, most likely with a dry tool or finger. Group 1 and Subgroup 1A features samples that could have been finished on leather hard clay, but later surface treatment might have altered the traces, and even though grains are inserted on those samples, the same threaded thin striations are present. Therefore, the leather hard clay finishing hypothesis is inconclusive but not discarded completely. In any case, one sample (AO1.5.S1) features both examples, so in a case of differential techniques, they did not necessarily involve different social contexts of production, but rather the convergence of dissimilar techniques within the same group of potters. Surface treatment involved leather hard clay smoothing and coating with slips (mainly red, and some brown). Double slips were also applied (red-on-white and red-on-orange). Apart from this, surface treatment involved burnishing and polishing (sample AO1.5.12), while decorations were incised (sample AO1.6.6, Subgroup 1A). The samples were fired in an incompletely oxidizing atmosphere at temperatures around 750 °C. The end products associated to this sequence consisted mainly of CRD (Ø 15.0-40.0 cm), but also CC (Ø 16.0-25.0 cm), CCC (Ø 24.0 cm), CR (exclusive to Subgroup 1A, Ø 17.0-25.0 cm), and CCo (exclusive to Group 1, Ø 30.0 cm). This sequence was found within the core cultural stratigraphic unit (SIII) but also in the one underneath (SIV).

Operational sequence AO-II

This category corresponds to petrographic Group 2, which is—as Group1—characterized by volcanic rock inclusions, such as granite, andesite, and, rarely, basalt, but in lower densities. Clays featured less iron content than Group 1, which could be related to differences in clay procurement and firing practices.

Figure 113: Example of colander fragments excavated at Aguas Buenas.

Figure 114: Example of colander fragments excavated at Aguas Buenas.

Also, possible tempering practices can be inferred due to the presence of angular and subangular quartz and feldspars (300 - 1000 µm). Fashioning involved the assembling of coils between 0.5 and 1.1 cm—smaller coils when compared to sequence AO-I—which were positioned in an alternate manner. The lip coils were either larger or the same size as those used for the vessel body and were placed either from the inside or the outside. Preforming involved pinching and drawing; finishing was undertaken on wet clay (prominent grains) with a technique that left thin-threaded striations performed with dry fingers or with a tool. However, leather hard clay smoothing might have erased previous steps of the operational sequence. Apart from this leather hard clay smoothing, surface treatment also involved the application of a red slip and polishing (only on sample AO1.5.2). The samples were fired in an incompletely oxidized atmosphere at temperatures <750 °C. Firing conditions, especially a shorter duration of the process, might explain the lighter tones of the matrix when compared with Group 1 instead of necessarily meaning the exploitation of a different clay outcrop. The end products associated with this sequence consisted of CRD (Ø 13.0-20.0 cm) and CR (Ø 17.0 cm); wall thickness ranged from 3.0 to 4.0 mm. This sequence was found exclusively within the core cultural stratigraphic unit of the excavation (SIII).

7.2 AGUAS BUENAS

The six excavation units placed at Aguas Buenas yielded 3020 ceramic fragments (16513.5 grams), featuring several vessel parts, such as rims, rim/necks, shoulders, shoulder/necks, bodies, bases, lugs, and supports. Decorating techniques included incisions, and it is relevant to mention the presence of colanders (**figures 113 & 114**).

Since radiocarbon dates obtained from the excavation units were divergent, all of the analyses—except for the mineralogical characterization—were done individually. Data is integrated at the end of this section, when reconstructing the different manufacturing operational sequences. **Table 22** provides an overview of the ceramic assemblage per unit, including basic data such as average length and wall thickness of the sherds, as well as the distribution of vessel shapes (restricted, unrestricted, or non-identified). Percentage and descriptive data were not added for excavation unit AB5 due to its reduced sample size (see **Appendix 5**).

Fragmentation and conservation status also varied among the excavation units. Fragments in all units featured angular edges, and their shapes were mostly quadrangular, triangular, and trapezoidal, which are typically from assembled elements fashioning, in particular the coiling technique. However, differences were found in hardness. Sherds from excavation units 1 and unit 2 were well-preserved and were hard upon touch, with tones usually

Excavation unit	Average length (mm)	Average wall thickness (mm)	% Restricted vessels	% Unrestricted vessels	% N/I Shapes
AB2	33,5	6,0-9,0	8	88	4
AB3	25,8	5,0-7,0	15	77	8
AB4	25	5,0-7,0	27	62	11
AB5	19	4,0-9,0	N/A	N/A	N/A
AB6	22,5	5,0-6,0	51	43	6

Table 22: Summary of general characteristics of the ceramic assemblages retrieved from Aguas Buenas.

between brown and orange. Minimal fire marks related to production were observed (i.e. AB2.57.2), but traces that could be related to use-alteration were also identified. Fragments from the rest of the units yielded a much lower conservation status, as shown by the high number of eroded surfaces—both internal and external—which were interpreted as post-depositional. This poor conservation status, especially identified for excavations units AB4, AB5, and AB6, affected the analysis of macrotraces derived from manufacturing practices. Vessels were fired at low temperatures (below 750 °C), with a few possible exceptions of higher temperatures. Firing atmospheres varied; most sherds were subjected to partial or complete oxidation, while others were reduced. This variability was preliminarily interpreted as the result of diverse firing techniques, mainly involving open hearths, but possibly also the use of kilns. A total of 689 sherds (11428.7 grams) were sampled from excavation units AB2, AB3, AB4, AB5, and AB6 for further analysis.

7.2.1 PASTE ANALYSIS

Macrofabric Groups

Excavation unit AB2

The analyzed assemblage was classified into ten different macrofabric groups that formed a compositionally homogeneous ceramic series (see **Appendix 9**). The same clay recipes, spanning from very coarse to medium, were mainly composed of feldspars, volcanic rock inclusions, quartz, dark mica, rounded clay pellets, and iron ores, so they were grouped according to differential grain size, frequencies, and firing technologies. Groups featuring very coarse and medium grains made up 30.0%, while groups with both coarse and fine grains made up 27.1% (**figure 115**). Those containing coarse and medium grains were 20.2% and granule and coarse were 19.7%, while fine and very fine groups were 3.0%. Therefore, the samples were characterized by bimodal matrices mainly containing very coarse to

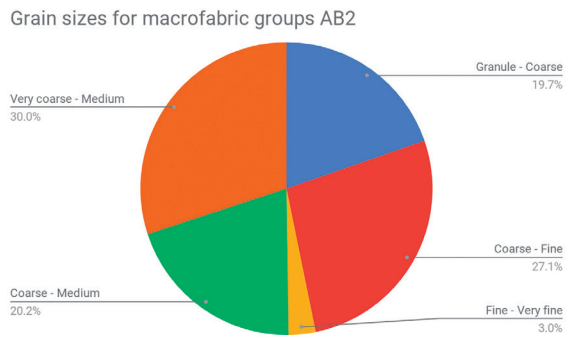

Figure 115: Distribution of the different textures identified in the macrofabric groups of EAB2.

coarse inclusions, with minimum amounts of fine-grained vessels. The frequencies of inclusions were highly homogeneous, with all macrofabric groups featuring between 20.0 and 25.0%, apart from two exceptions: groups AB2.A with up to 30.0% and AB2.F (the fine group) with 10.0-15.0%. Subangular to rounded inclusions predominate, with a clear tendency towards low sphericity, with only group AB2.A as an exception combining both low and high sphericity inclusions, as well as group AB2.L, which featured angular grains in combination with subangular and subrounded ones. The orientation of the inclusions was usually oblique, subparallel, concentric and chaotic, which is consistent with the coiling technique for preforming vessels. Generally, voids were of plate-like, oval-sphere, and irregular shapes, mostly featuring chaotic and subparallel orientations.

Regarding firing technology, variability in the core-margin relationship as well as Munsell colors of cross-section and surfaces suggest different temperatures, duration of firing, and position of the vessel (or vessel part) in relation to the fuel source of an open hearth. These variables explain the range

from complete oxidation to different varieties of incomplete oxidation, yielding surface and cross-section tones usually brown (including yellowish, light, and grayish brown), as well as orange. Production fire marks were minimally identified, while carbonization derived from use-alteration was common and was usually represented by charred encrustations on internal surfaces with transfer into the wall, as well as some examples of external deposition of soot (i.e. samples AB2.H1(4) and AB2.L4(1)). Macrofabric group AB2.F stands out due to its bright orange surface and cross-section colors, suggesting a complete oxidizing atmosphere with very good control of firing temperature and duration, possibly a kiln.

Excavation unit AB3

The ceramics retrieved from this excavation unit were divided into five different macrofabric groups that formed homogeneous ceramic series (see **Appendix 9**). The same clay recipes, which mainly featured feldspars, volcanic rock inclusions, and clay pellets, were combined in diverse sizes and textures. The ceramic series span from coarse to fine, share similar paste texture, types of inclusions and voids in the different grain size options. The variability in the clays might be connected to a multiplicity of geologically similar clay sources but could also relate to differential paste preparation and firing practices.

Groups featuring mainly coarse-medium grains made up 47.5% of the sample and those containing medium grains were 29.5%, while medium and fine groups were represented by 23.0% each (**figure 116**). Very coarse and exclusively fine-grained sherds were absent in the sample. Frequency of inclusions was varied, averaging 15.0% except for the group featuring coarse and medium grains, which yielded an inclusion frequency up to 25.0%. Sphericity of inclusions was classified as low, with subangular and subrounded as the most common shapes, and with the presence of angular inclusions only on macrofabric group AB2.A. This points to riverine clay sources, characterized by weathered materials and an absence of recent transport episodes. Orientations of the inclusions varied between subparallel, concentric, and oblique, as well as chaotic, which are consistent with the coiling technique for preforming vessels. Voids were generally of plate-like, oval-sphere, and irregular shapes, and their orientation was subparallel, concentric, oblique, and chaotic.

Variability in the core-margin relationship, cross-section and surface Munsell colors suggest that firing practices involved different temperatures, duration of firing, and position of the vessel (or vessel part) in relationship to the fuel source, possibly an open hearth. These variables explain the range from complete oxidation to different varieties of incomplete oxidation and reduction, yielding surface and cross-section tones of brown, light brown, and orange. Internal smoked surfaces were present, but production fire marks were not identified, and carbonization derived from use-alteration, especially on internal surfaces (i.e. sample AB3.C4.1) was common.

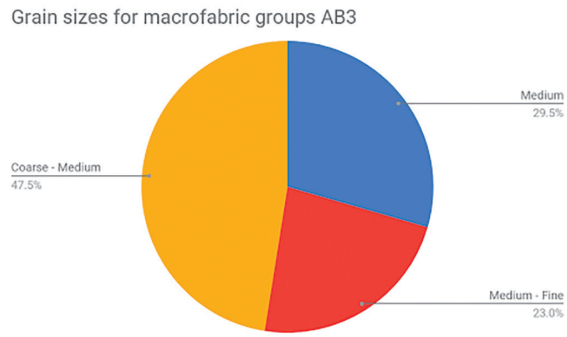

Figure 116: Distribution of the different textures identified in the macrofabric groups of EAB3.

Excavation unit AB4

In total, ten different macrofabric groups were identified in the sample analyzed, as well as several outliers (see **Appendix 9**). The groups were homogenous, featuring clay recipes that mainly contain feldspars, dark mica, rock fragments, and quartz. These sets of inclusions were repeated in different sizes and frequencies, resulting in a homogenous assemblage comprised of several groups.

Groups featuring mainly coarse and fine grains consisted of 55.7% of the sample, while the ones containing coarse and medium grains were 42.3%, and exclusively coarse grains were identified in 2.0% of the sample (**figure 117**). No very coarse or fine groups were identified in the assemblage, which was characterized by bimodal and trimodal matrices. Frequency of inclusions was homogeneous, usually between 15.0-20.0%, with the exception of group AB4.A (coarse-medium), which featured 30.0%.

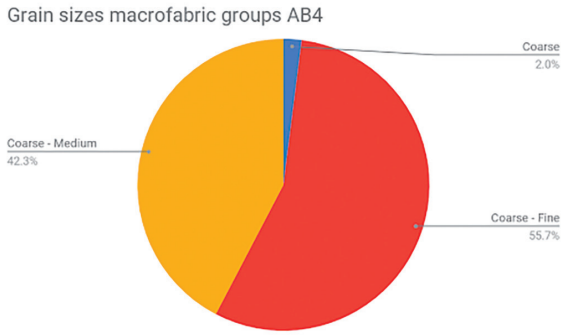

Figure 117: Distribution of the different textures identified in the macrofabric groups of EAB4.

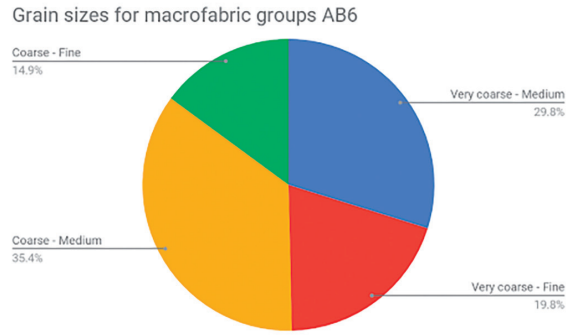

Figure 118: Distribution of the different textures identified in the macrofabric groups of EAB6.

Apart from that, inclusions tended towards low sphericity, with subangular, angular, and subrounded shapes. Orientation of the inclusions was usually chaotic, but also subparallel and concentric. Voids were generally of a plate-like, oval-sphere, or irregular shape, and their orientation was mainly subparallel and oblique.

As mentioned above, the sample from excavation unit AB5 was too fragmentary, so no description will be included. However, the characteristics of the only macrofabric group identified (AB5.A, see **Appendix 9**) matched macrofabric group AB4.A, suggesting connections between the two. Therefore, the analysis of AB4.A will also encompass AB5.A in this section.

Variability in the core-margin relationship, cross-section and surface Munsell colors suggest that firing practices involved different temperatures, duration of firing, and position of the vessel (or vessel part) in relationship to the fuel source, possibly an open hearth. These variables explain the range from complete oxidation to different varieties of incomplete oxidation, yielding sherds with reddish brown and brown colors. Smoked internal surfaces were common, while fire marks from production were not identified. Deposition of soot was observed on sample AB4.E4(1), but erosion and threshing are strong biases for these kinds of surface examinations. Calcite encrustations on surfaces were interpreted as post-depositional because they are present not only on the surface of sherds, but also on the fractures. This was previously noted by Casale for the assemblage at M1 (Casale 2017, 80, 115), who proposed that this calcareous layer may either be related to an intentional calcareous water mixture wash or to post-depositional processes, such as water percolation.

Excavation unit AB6

Seven macrofabric groups were characterized for excavation unit AB6 (see **Appendix 9**). The assemblage was similar to AB4 and AB6 in the multimodality of the clay matrices, featuring a wide range of sizes of inclusions, which could be related to differential paste recipes in relation to AB2 and AB3 (i.e. sorting strategies in the latter) or divergent clay procurement practices (preference for other clay outcrops featuring several grain sizes of inclusions). For AB6, groups were predominantly coarse-medium (35.4%), very coarse-medium (29.8%), very coarse-fine (19.8%), and coarse-fine (14.9%) (**figure 118**). Their composition was very similar, mainly featuring feldspars, dark mica, rock inclusions, and quartz. Since differences among groups were only found in texture and frequency, it is possible that one single clay outcrop was used for most of the sherds. Frequency of inclusions was usually around 20.0%, with merely the groups featuring very coarse grains exceeding this trend to up to 30.0%. Apart from that, inclusions tended towards low sphericity, with subangular, subrounded, and angular shapes. The predominant orientation of the inclusions was chaotic, subparallel, and concentric. Voids were generally of an oval-sphere shape, and their orientation was mainly chaotic.

Variability in the core-margin relationship, cross-section and surface Munsell colors suggest that firing practices involved different temperatures, duration of firing, and position of the vessel (or vessel part) in relationship to the fuel source, possibly an open hearth. These variables explain the range from complete oxidation to different varieties of incomplete oxidation. The assemblage is too eroded

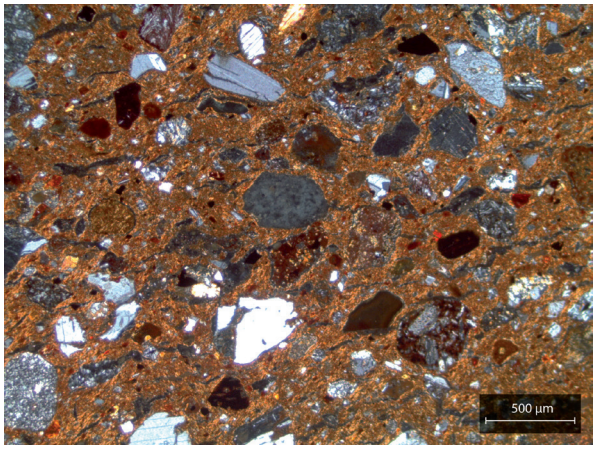

Figure 119: Example of a typical fabric for petrographic Group 1. Sample AB4.81b was photographed in XP (credit: Simone Casale).

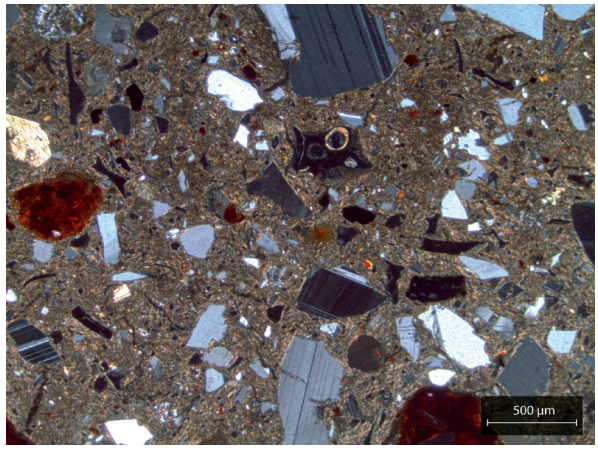

Figure 120: Example of a typical fabric for petrographic Group 2. Sample AB2.35.S2 was photographed in XP (credit: Simone Casale).

and fragmentary to make any observations regarding traces of firing techniques or use-alteration marks on the surfaces of the sherds.

Petrographic Groups

The 43 samples examined through a polarizing light microscope were classified into seven petrographic groups and four subgroups, as well as several outliers (Casale *et al.* 2019). Even though all the groups are connected to volcanic geological settings, their mineralogical content was very distinctive. Also, it seems that paste preparation practices might have included sorting, tempering, and some sieving. In general, the assemblage analyzed was defined by very coarse, coarse, and medium inclusions of intermediate extrusive igneous rocks (200-2000 µm), quartz (50-900 µm), feldspars (100-900 µm), iron-rich inclusions (50-500 µm), and volcanic ash and glass (200-600 µm). Accessory minerals included ortho- and clinopyroxene (50-600 µm), augite (50-600 µm), olivine (100-650 µm), and clay pellets (200-600 µm). Voids tended to be of elongated shapes between 50 and 250 µm, and moderately oriented to vessel walls. Even though the sample was mineralogically homogenous, the size, frequency, and proportion of inclusions was variable, which allowed for the creation of several groupings.

Group 1, the main cluster, is characterized by a high frequency of very coarse to fine angular to subrounded intermediate extrusive igneous rock inclusions (200-1700 µm), mainly connected to andesitic and weathered unidentified fragments. Apart from that, this group features basalts in combination with angular to subrounded iron-rich inclusions (100-500 µm), volcanic ash and glass (200-600 µm), and olivine crystals (100-400 µm). Quartz and feldspars are also present but have subangular shapes of a considerably smaller size (300 to 500 µm) (**figure 119**).

Fragments classified as a subgroup of Group 1 yielded higher frequencies of subrounded to round basalt inclusions and were only found in samples excavated in unit AB2. Elongated voids (150-250 µm) are moderately to not oriented to the walls. Estimated firing temperature is between 650 and 750 °C. Contextually, most samples within this group were recovered from excavation units AB3, AB4, and AB6, with only one fragment from AB2. The subgroup only comprised samples excavated at AB2, with the exception of one from AB3. **Group 2** is dominated by fine to coarse angular to rounded quartz and feldspar inclusions (100-900 µm)—which were possibly added as temper—in combination with volcanic ash and glass (200-600 µm) and rare subangular to rounded volcanic rock inclusions (200-600 µm) mainly related to andesites but also to unidentified weathered rock (**figure 120**).

The regular size of volcanic inclusions suggests sieving practices prior to tempering. Voids were long and elongated (100-250 µm) and oriented to the borders. Estimated firing temperature is between 650 and 750 °C, except for sample AB4.81c that featured a less optically active matrix, possibly suggesting a higher firing temperature. A subgroup within this cluster is represented by sample AB2.22.2, which yielded a very

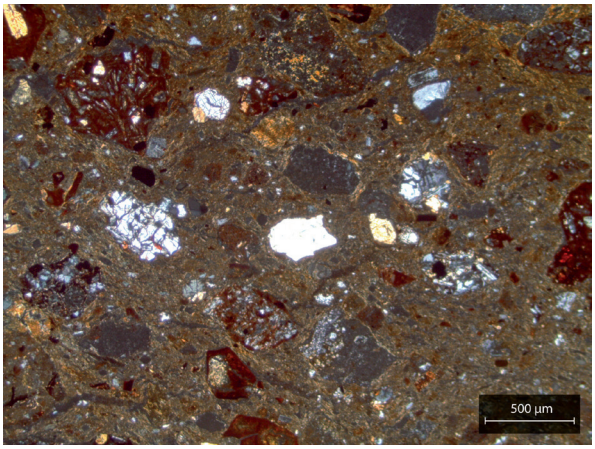

Figure 121: Example of a typical fabric for petrographic Group 3. Sample AB5.173 was photographed in XP (credit: Simone Casale).

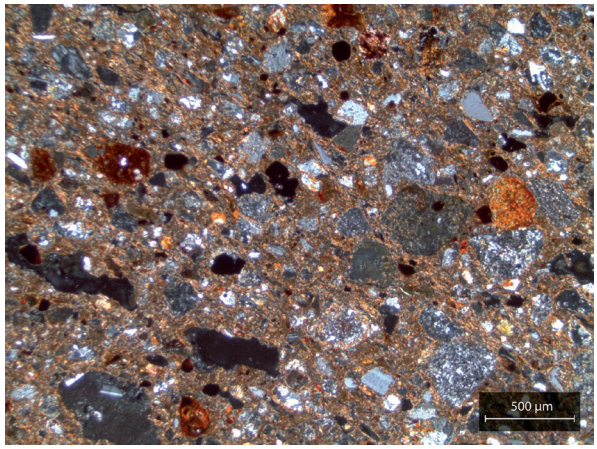

Figure 122: Example of a typical fabric for petrographic Group 4 featuring rock fragments, voids, clay pellets, quartz, plagioclase, and iron-rich inclusions. Sample AB2.57.3 was photographed in XP (credit: Simone Casale).

similar geological substrate but a lower frequency of quartz and feldspars and a higher frequency of volcanic rocks, possibly representing the raw clay materials without the paste preparation applied to the general group—sieving to remove the naturally occurring inclusions related to rock fragments followed by tempering with crushed quartz and feldspars. **Group 3** is defined by a >30.0% frequency of subrounded to rounded, very coarse to medium basalt inclusions (250-1500 µm) characterized by lamellar plagioclase inclusions, yellowish olivine, and augite phenocrysts, as well as an absence of unidentified weathered rock fragments, which are present in the other groups (**figure 121**).

The ubiquity and shape of basaltic inclusions suggest their presence in the raw material outcrop, discarding tempering in favor of differential clay procurement practices when compared with the rest of the groups. Frequent accessory minerals include orthopyroxene and augite (100-500 µm), crystals of olivine (100-650 µm), volcanic ash (200 µm), and subrounded clay pellets (200-500 µm). Long elongated voids (100-200 µm) are oriented to the walls. Estimated firing temperature is between 650 and 750 °C. The subgroup within this cluster is also characterized by a high frequency of basaltic inclusions of different sizes and subrounded to rounded shapes, in combination with unidentified weathered rock fragments and colorful and pale yellow olivine and augite. **Group 4** features >35.0% frequency of subangular to subrounded coarse to medium inclusions (100 to 600 µm and isolated grains of up to 2000 µm), mostly andesitic, unidentified weathered rock fragments, with (rarely) basalts, in combination with subangular to angular quartz (150-650 µm) and angular to subangular K-feldspars and plagioclase (100-600 µm) (**figure 122**).

Accessory minerals commonly observed were orthopyroxene and augite (100-600 µm), subrounded to subangular iron-rich inclusions (50-500 µm), and irregularly shaped volcanic ash and glass (100-600 µm). Rock inclusions are usually between 500-600 µm, suggestive of sorting practices. Voids were elongated (50-250 µm) and were oriented to the walls but often surrounded by coarse inclusions. Estimated firing temperature is between 650 and 750 °C. A subgroup within this cluster was created for sample AB4.81d, which yielded different firing conditions that resulted in a darker brown matrix. Also, inclusions within this sample are mineralogically similar to the group but feature more variability in size. Therefore, this sample was probably manufactured from a similar clay, but paste preparation and firing techniques are dissimilar. This might have contextual explanations, since the group is comprised of samples from AB2 and AB3, while this technological subgroup is represented by a sample from AB4.[78] **Group 5** yielded a bi-modal matrix with coarse and very

78 See Chapter 5.3.1 for a description of the location of the different excavation units within Aguas Buenas and their hypothesized chronological differences.

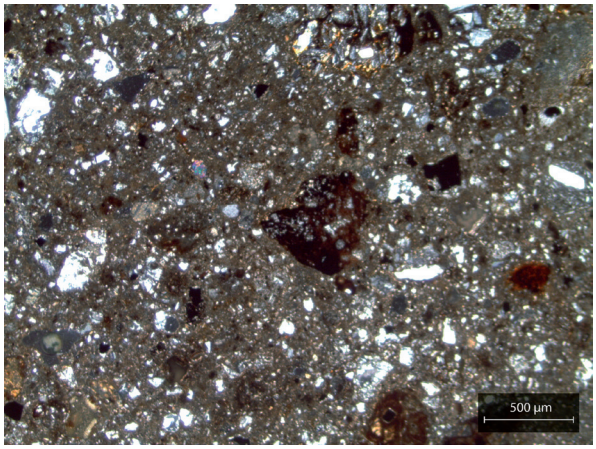

Figure 123: Example of a typical fabric for petrographic Group 5, a bimodal matrix featuring coarse intermediate extrusive volcanic rock inclusions with rare basalt in combination with smaller quartz and plagioclase feldspars. Sample AB2.35.S3 was photographed in XP (credit: Simone Casale).

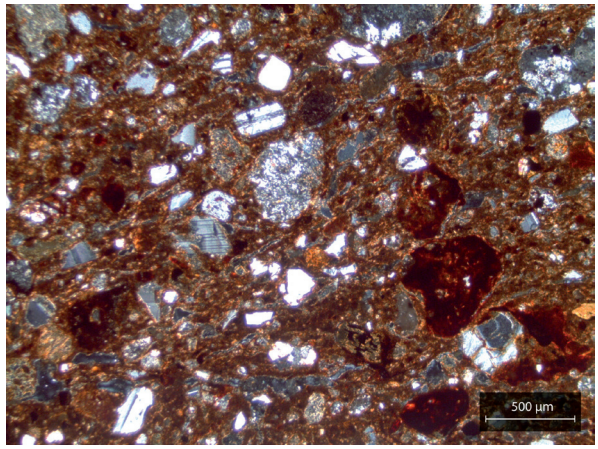

Figure 124: Example of a typical fabric for petrographic Group 6. Sample AB2.57.1 was photographed in XP (credit: Simone Casale).

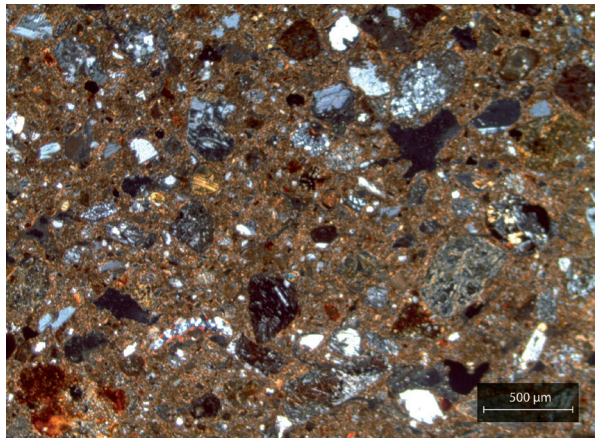

Figure 125: Example of a typical fabric for petrographic Group 7. Sample AB3.90 was photographed in XP (credit: Simone Casale).

coarse subangular to subrounded intermediate extrusive volcanic rock inclusions (500-1600 µm) composed of microphenocrysts of plagioclase and pyroxenes, globular quartz minerals, and reddish-brown inclusions with lamellar plagioclase (**figure 123**).

A distinctive characteristic is that basalts are very rare. Rather, this group is composed of ortho- and clinopyroxene (150-400 µm), subangular to subrounded quartz (usually around 150, but up to 500 µm), subangular to rounded iron-rich minerals (100-500 µm), subangular plagioclase feldspars (usually 200 µm, but up to 500 µm), olivine (150-300 µm), subrounded to rounded volcanic ash (200-400 µm), and glass (200-500 µm). Elongated vughs and vesicles (50-150 µm) were from moderately to not oriented to the walls. Firing temperature was estimated between 650 and 750 °C. **Group 6** featured a mineralogical composition strongly related to andesite, with several coarse to medium inclusions of subrounded to rounded intermediate extrusive igneous origin (200-800 µm), characterized by fine quartz minerals and mainly connected to andesites as well as isolate angular to rounded quartz crystals (300-600 µm) (**figure 124**).

It is distinctive that feldspars are considerably fewer than quartz and always feature angular shapes between 200 and 600 µm, which could suggest limited tempering practices. Elongated voids (150-250 µm) were oriented or moderately oriented to the walls. Firing temperature was estimated between 650 and 750 °C. **Group 7**, the only cluster not containing samples excavated at AB2, is characterized by a coarse to fine matrix with subangular to rounded intermediate volcanic rock inclusions that feature very fine quartz crystals, mostly connected to andesites and (rarely) basalts (500-800 µm) (**figure 125**). Apart from that, angular to subrounded quartz crystals of two different size ranges (100-300 µm, abundant / 500-600 µm, few) and angular to subangular feldspars (150-500

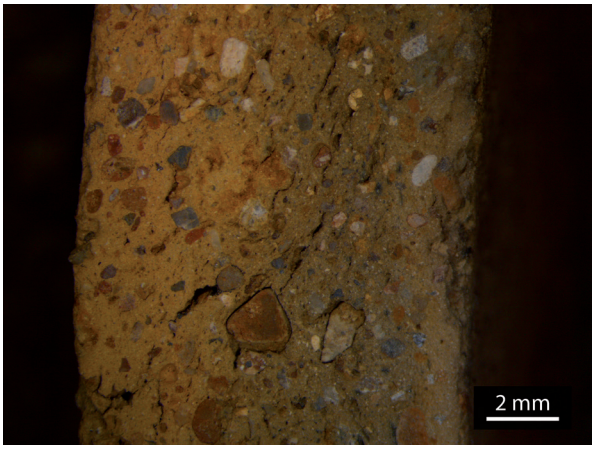

Figure 126: Cross-section from the ceramic assemblage EAB2 featuring coils.

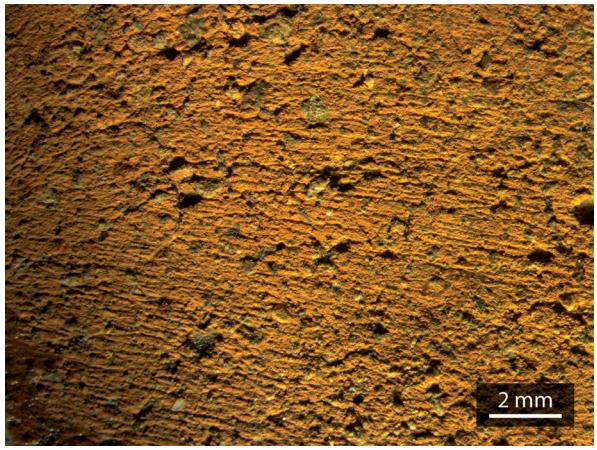

Figure 127: Wet clay traces (prominent grains combined with threaded striations), internal surface of sample AB2.35.S3.

µm) are common. Volcanic ash and glass (200-500 µm) are also commonly identified. Long, elongated voids (100-250 µm) were moderately oriented to the walls. Firing temperature was estimated between 650 and 750 °C.

7.2.2 MACROTRACES OF MANUFACTURING PRACTICES

The general overview of the assemblage suggested preforming through assembled elements, following several lines of evidence. First, the shape of the fragments and orientation of inclusions support coiling as the main fashioning technique. Second, the topography of the sherds is irregular, thinning and thickening at regular intervals, and coil junctures are often visible in cross-section (**figure 126**). Third, excavation unit AB2 evinced a preference for wet clay fashioning and finishing (**figures 127** and **128**), followed by extensive leather hard clay smoothing as surface treatment (**figure 129** and **130**), performed with a soft tool and with an absence of burnishing gestures.

AB3 possibly combined both leather hard clay and wet clay fashioning, but leather hard clay smoothing usually obscures the previous traces of the operational sequence. AB4 also seems to combine different techniques, but poor conservation of surfaces did not allow for a full macrotrace study. For excavation units AB5 and AB6, only a few selected samples were studied, since most of the assemblage featured threshed surfaces that are not suitable for examination.

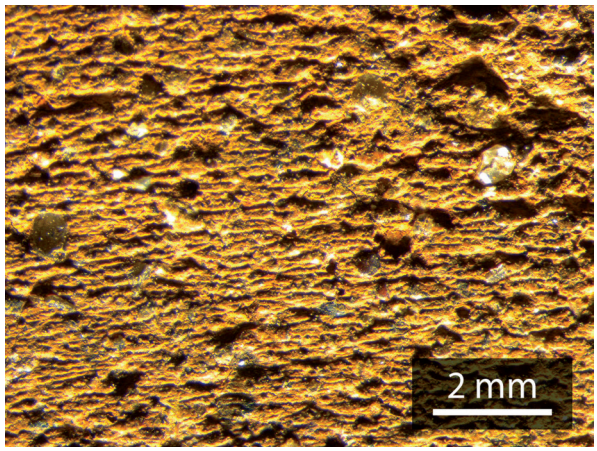

Figure 128: Wet clay traces (prominent grains combined with threaded striations), internal surface of sample AB2.35a.

In general, surface treatment of the Aguas Buenas assemblage is characterized by extremely minimal traces of burnishing (only at AB2 and AB4) and a lot of investment in coating with slips, also featuring combinations of two colors as decoration (mainly at AB2 and AB3, but also one sample from AB4). Other decorative techniques include incisions in both leather hard and wet clay (also one sample from AB6), along with some paint, appliqués, and appendages.

The 43 petrographically characterized samples were also examined for macrotrace identification

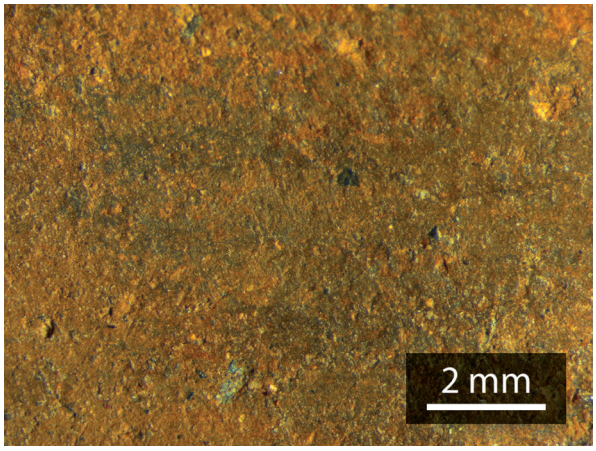

Figure 129: Leather hard clay traces (inserted grains), external surface of sample AB2.35.1.

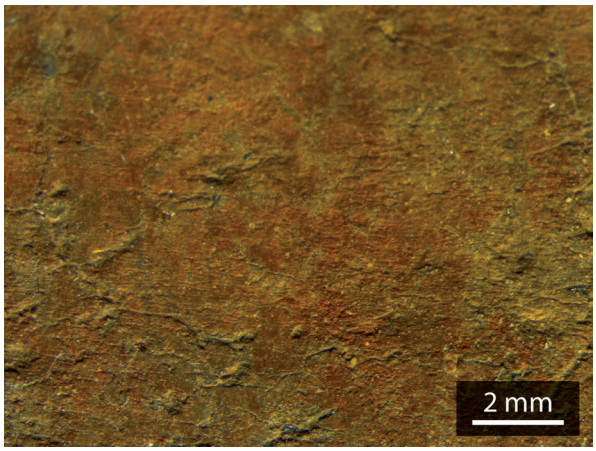

Figure 130: Leather hard clay traces (inserted grains) and red slip, external surface of sample AB2.35.2.

of manufacturing practices. All samples featured fashioning through assembled elements (coils), which measured between 10.0 and 15.0 mm wide in 62.0% of the cases (both restricted and unrestricted shapes, wall width between 3.5 and 11.0 mm), while 26.0% of the coils ranged between 15.0 and 19.0 mm (restricted and unrestricted vessels, wall width 5.0-10.0 mm, one sample 3.5 mm), and 12.0% measured between 7.0 and 9.0 mm (restricted and unrestricted vessels from AB2 and AB3 only, wall thickness 3.5-6.5 mm). Assembled elements were always possible to measure with only one exception, suggesting less intensity in roughing-out gestures.

Coils were positioned equidistantly and in an oblique fashion, either with gestures from the outside to the inside of the vessel (26.0%) or vice versa (31.0%), spiral (12.0%, only in AB2), and alternate (7.0%); in 24.0% of cases it was not possible to assess this gesture. Also, lip coils were positioned either from the outside or inside and were generally the same size as body coils, but occasionally larger. Preforming was carried out mainly through pinching and drawing; 62.0% of samples featured wet clay finishing, either scraping with a soft tool or with the fingers (dry or re-hydrated). It is not possible to determine accurately the technique applied or the specific tool in all of the cases, since surface treatment practices in leather hard clay as well as erosion may have erased almost all evidence of the previous finishing gestures. Leather hard clay gestures for shaping and finishing were identified in 31.0% of the sample and possibly involved shaving and smoothing with re-hydrated fingers. Sample AB2.A2(4)/AB2.57b is of relevance since it might evince the combination of wet clay techniques on the internal surface of the vessel combined with leather hard clay gestures on the external one, suggesting that both practices were shared by the same community of potters. Surface treatment might have erased the variability of these stages in the operational sequence. Striations were frequent, present in 70.0% of samples, and were connected either with wet clay or leather hard clay finishing gestures, leaving distinguishably different traces. Combinations of types of striations and grain position was very useful for sorting out traces. Surface treatment consisted of leather hard clay smoothing with a soft tool, unusual burnishing, and most commonly coating with slips or *barbotine*. Slips varied contextually; AB2 was dominated by red, reddish-brown, brown, white (only present in macrofabric groups AB2.F and outliers), and a unique bright orange that is characteristic of the assemblage (**figure 131**), departing from the red preferences observed within the rest of the sample (including other sites), but combined with a red slip on top of it (**figure 132**).

AB3 featured brown, orange (not bright), reddish-brown, dark red, and white slips, while AB4 yielded minimal coated fragments on red and brown, sometimes applied over a layer of *barbotine*. AB5 and AB6 were too eroded and fragmentary, but the latter yielded a white-slipped fragment. Decorating techniques were usually applied on leather hard clay, with the exception of some incised fragments done in wet clay.

Figure 131: Bright orange slip, characteristic of the AB2 assemblage.

Figure 132: Red-on-orange slip, characteristic of the AB2 assemblage.

Figure 133: Example of a fragmentary annular base (AB2).

Figure 134: Example of an annular base from La Pachona (trench, unit 3, layer I, level 4).

The fragmentation and erosion of the sample prevents a full macrotrace analysis and does not allow for a full reconstruction of the operational sequences of whole vessels. However, at least for AB2, bases were shaped spirally and could include annular bases, which are absent in the rest of the sample (and are characteristic of sites not included in this book, but dated between cal 900 and 1250 CE, such as Sabana Grande, Roberto Amador, and La Pachona) (**figures 133** and **134**). Apart from that, two fragments of bases at AB3 feature a double layer of coils pinched together. Additionally, junctures between different vessel parts yield preferential fractures and sometimes reinforcements, suggestive of the fashioning of vessels in different parts that were assembled after a short drying period.

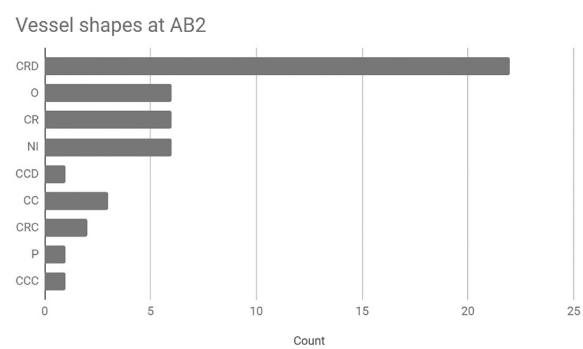

Figure 135: Vessel shapes at AB2.

7.2.3 MORPHOMETRIC ANALYSIS

Due to the sample size, a quantitative assessment of vessel shapes is only possible for excavation unit AB2, which showed a strong tendency towards unrestricted vessels (**figure 135**). This group was dominated by CRD, which measured between 8.0 and 30.0 cm in mouth diameter and had a wall thickness ranging from 4.5 to 8.5 mm. On average, their diameter was 17.2 cm (68.0% <20.0 cm and 32.0% >20.0 cm). The rest of the unrestricted vessels consisted of straight walled jars (CR) with diameters between 17.0 and 45.0 cm, while their walls ranged between 5.0 and 7.0 mm in thickness. Curved jars yielded diameters between 15.0 and 50.0 cm, and their walls ranged between 4.5 and 9.0 mm. Convergent straight walled

jars (CRC) measured between 5.0 and 18.0 cm in diameter, and their walls ranged between 5.0 and 7.0 mm. Also, one large plate was identified, with a 40.0 cm diameter and 4.0 mm wall thickness. The restricted vessels were comprised of only *ollas*, with diameters between 7.0 and 30.0 cm and a wall thickness of 4.0-12.0 mm. Excavation unit AB2 also included six fragments of colanders (see **figure 114**), four corresponding to unrestricted vessels and two to restricted ones. Wall thickness was homogenous, usually measuring between 2.5 and 3.5 mm, with one thick exception (AB2.60, 7.5 mm). Orifice ranges were generally between 2.0 and 2.5 mm, with regular and irregular circular shapes (suggesting different tools and gestures), always crafted from the outside to inside of the vessel. Only one sample featured orifices smaller than 2.0 mm (AB2.39.S1), a choice that might be connected to the vessel use.

For excavation unit AB4, only a CRD of 15.0 cm diameter and 8.0 mm wall thickness was identified, while AB6 featured plates (20.0-40.0 cm diameter, 4.0-5.0 mm wall thickness) and jars (CCO and CRC) measuring 5.0-20.0 cm diameter and 6.0 mm in wall thickness.

Even though excavation unit AB1 was not sampled for analysis, a morphometric assessment was also conducted for comparative purposes, both synchronic (mainly in relationship to excavation unit AB2) as well as diachronic (with units AB4, AB5, and AB6). In spite of a similar proportion between restricted (8.5%) and unrestricted vessels (88.0.0%), the most ubiquitous confirmed shapes at AB1 were *ollas*, with diameters between 7.0 and 15.0 cm and wall thicknesses between 3.0 and 9.0 cm. The unrestricted vessel group was dominated by CRD (15.0-35.0 cm diameter, 4.0-8.0 mm wall thickness), followed by jars (CC, CR, CCC) measuring 15.0-35.0 cm diameter, 3.0-9.0 mm wall thickness.

7.2.4 DECORATING TECHNIQUES

The AB2 sample featured fragments with slipped surfaces—either internal, external, or both—on 71.0% of the sample analyzed. Slips were variable in color, which included red, reddish brown, a bright orange[79] that was distinctive for this assemblage, brown, and white only present in macrofabric group AB2.F and outliers. However, only 15.0% of the samples featured other forms of decoration, which were dominated by coating vessels with a double slip, followed by incisions, appliqué, appendages, painted, and impressed decoration.

Coating with two layers of slips mainly featured red-on-orange (92.0%) applied to external or internal surfaces, sometimes in combination (see **figure 132**). Only two samples—both belonging to the particular AB2.F macrofabric group—yielded red-on-white, while sample AB2.B3(3)/AB2.58 was decorated with an orange slip applied on a previous layer of white slip. Only one fragment (AB2.F3(1)/AB2.57, also within AB2.F) evinced polychromy, achieved through the application of one 3.0 mm wide painted black line on the external surface of the rim, parallel to the lip, while red was applied on the internal surface, all with a white slip base. Incised decoration can be separated into two different groups. The first one featured subparallel incised lines (<0.5 mm) usually done on leather hard clay on the external surface of the vessel, with sample AB2.A1(2)3/AB2.54 as the exception, with incisions cut into the internal surface of the vessel on wet clay, suggestive of a *molcajete* shape. Incisions were as also made as bands of subparallel lines (0.5-1.5 mm), either on external surfaces generally belonging to *ollas*, specially the necks and shoulders, featuring criss-crossed or oblique (geometric) patterns and done either on leather hard or wet clay (**figure 136**). The geometric pattern was the only one identified on internal surfaces, so the criss-cross one is exclusive to *ollas* and to external surfaces. This type of decoration on *ollas* is also present in other sites, such as Sabana Grande, Roberto Amador, and La Pachona.

In two cases, incised and appliqué decoration was combined. Sample AB2.D1(1)/AB2.58.6 featured an applied coil (4.0 mm in height) on the juncture between the base and body/rim of a plate, with subparallel incisions (1.0 mm). Sample AB2.B4(5)/AB2.35 yielded subparallel incisions (<0.5 mm) oblique to an appliqué coil (6.5 mm wide), which could be a reinforcement for assembling another part of the vessel, but smoothing of its surface makes the interpretation unclear. Appendages include mainly annular bases (coils 13.0-15.0 mm wide, only one sample features a thinner 7.0 mm version), but also scars possibly related to supports or handles, as well as one oval support (16 by 20 mm), which also features white slip. One outlier (sample AB2.58) features a possible support or adorno with impressed decoration.

79 Comparable to the one present in sample OP1.176.

Figure 136: Diagnostic incised *olla* from AB2.

Coating with slips at AB3 was present in 80.0% of the samples, while other decoration practices mainly consisted of double slipping, red-on-orange and red-on-white, covering either one or both surfaces, which were identified mainly on macrofabric group AB3.B. Minimal incisions featuring similar techniques to AB2 were identified, and appendages such as lugs and supports were recorded. Fragment AB3.C1(5)/AB3.133 was the only one to feature *acanaladura* in the whole AB assemblage. AB4 yielded only 25.0% of slipped fragments, but this underrepresentation could be linked to conservation issues. One sherd featuring a double slip (red-on-white) was identified at AB4, while a fragmentary sherd with appliqué was observed in the AB6 assemblage.

7.2.5 CERAMIC MANUFACTURING SEQUENCES AT AB

Based on the data analyzed above, two different manufacturing sequences are proposed for the assemblage excavated at Aguas Buenas. The first sequence, AB-I, is related to raw material procurement connected with a basaltic rich source, while AB-II is connected to an outcrop characterized by andesite as the parent material. Within sequence AB-II, subsequences were formed according to paste preparation practices. For example, AB-IIa evinced sieving followed by tempering, whereas AB-IIb suggested only tempering, with both composed of coarse grains. In contrast, AB-IIc consisted of a very coarse fabric that was sorted. Sequences AB-IId and AB-IIe were both very coarse and did not yield evidence of specific paste preparation; yet, their characterization suggests differential procurement choices. A subgroup within sequence AB-IId reconnects with AB-I due to its higher basaltic content.

Operational sequence AB-I

This category corresponds with petrographic Group 3, characterized by its coarse volcanic (basalt) inclusions. The materials were used with no apparent paste preparation practices to produce both restricted and unrestricted vessels (including CRD and *ollas*), of 10.0-30.0 cm in diameter and 4.0-10.0 mm wall thickness. Fashioning involved coils between 1.2 and 1.9 cm, which were positioned in an oblique manner, from inside to outside or vice versa. Lip coils were positioned either from the outside or the inside. Preforming involved pinching and drawing, and finishing was generally undertaken on wet clay, as evinced by the prominent grains and threaded striations on the surface of the sherds. Sample AB2.G1(3)/AB2.56.S2 featured leather hard clay fashioning, indicated by inserted and ejected grains in combination with threaded striations and a compact microtopography. Surface treatment involved leather hard clay smoothing and coating with slips (red or orange). Sample AB2.D3(3)/AB2.58.4 featured incised decoration, comprised of bands of subparallel lines done possibly on wet clay, criss-crossing each other on the external surface of the vessel. The samples were fired in an incompletely oxidized atmosphere at temperatures around 750 °C. This sequence was found in excavation units AB2, AB4, and AB5.

Operational sequence AB-II

This sequence is subdivided according to the presence of paste preparation practices (AB-IIa, AB-IIb, and AB-IIc) and the use of very coarse raw materials without any apparent addition or subtraction of materials (AB-IId, AB-IIe, and AB-IIf).

AB-IIa corresponds to petrographic Group 2, characterized by raw materials that were first sieved and then tempered with quartz and feldspars. End products consisted of mostly unrestricted vessels (CRD and MLC) with diameters between 25.0 and 30.0 cm and wall thicknesses from 6.5 to 8.0 mm. One restricted vessel was possibly identified as well,

with a wall thickness of 7.0 mm. Fashioning involved the assembling of coils between 1.3 and 1.7 cm. Assembled elements were positioned equidistantly and in an oblique manner, with gestures exclusively from the outside to the inside of the vessel, followed by pinching and drawing. Finishing was undertaken on wet clay (prominent grains combined with threaded striations and irregular topography). Surface treatment involved smoothing on leather hard clay, as well as coating with red or orange slips. Only the *molcajete* shape (AB2.H4(3)/AB2.35. S2) featured decoration of bands of subparallel incisions (<1.0 mm) criss-crossing each other on the internal surface of the vessel. Samples were fired in a partial to completely oxidized atmosphere at temperatures below 750 °C. Samples were retrieved from excavation units AB2 and AB4. A subgroup in this cluster (sample AB2.22.2) evinces use of a very similar clay outcrop with an absence of paste preparation practices, while the rest of the operational sequence is similar. However, it yielded thicker walls than the rest of the group (on average 11.0 mm), which could suggest a functional reason for not sieving and tempering the paste.

AB-IIb correlates with petrographic Group 6, which is recognizable by its coarse volcanic inclusions combined with quartz and feldspars, the latter in lower quantities but with angular shapes and regular sizes, suggesting tempering practices. End products consisted of both unrestricted vessels (P and CR) with diameters between 17.0 and 20.0 cm and a wall thickness from 5.0 to 7.0 mm. One possible restricted vessel was identified as well, with a wall thickness of 9.0 mm. Fashioning involved the assembling of coils between 1.1 and 1.6 cm, which were positioned equidistantly and in an oblique manner, with gestures from inside to outside and vice versa, followed by pinching and drawing. Finishing was undertaken on wet clay (prominent grains combined with threaded striations and irregular microtopography). Surface treatment involved smoothing on leather hard clay, as well as coating with red, brown, or white slips. Sample AB6.A1(1)/AB6.112.1 evinced threaded striations combined with protuberant grains (as in AO1), and coating with a white slip was done without leather hard clay smoothing. This is an important difference when taking into account that this is the only sample excavated at AB6, potentially contemporary with AO1. Sample AB2.A3(2)3/AB2.57.1 featured burnishing on its external surface, as well as the combination of red slip on its external surface and brown slip on its internal wall. Samples were fired in a partial to completely oxidized atmosphere at temperatures below 750 °C.

AB-IIc correlates with petrographic Group 4, which is identified by inclusions mainly of volcanic rocks, quartz, and feldspars of regular sizes, suggesting sorting practices. End products consisted of unrestricted vessels (CRD) with a diameter of 10.0 cm and wall thickness of 6.0 mm. The restricted vessel within this group (a CCC or T) featured a 17.0 cm diameter and 3.5 mm wall thickness. Fashioning involved the assembling of coils between 0.7 and 0.8 cm, which were positioned equidistantly and in an oblique manner, with gestures from inside to outside and vice versa, then followed by pinching and drawing. Finishing was undertaken on leather hard clay (inserted grains combined with threaded striations and irregular microtopography). Surface treatment involved smoothing on leather hard clay, as well as coating with a red or white slip; the latter was also burnished. Samples were fired in a partial to completely oxidized atmosphere at temperatures below 750 °C. Sample AB4.G2(1)/AB4.81d was classified as a subgroup because, even though it evinces similar clay procurement choices, paste preparation and firing were noticeably different, with no evidence of sorting and a shorter firing time. Also, coils were significantly larger (1.6 cm), and both shaping and finishing were done on wet clay. Surface treatment was similar to the rest of the sequence, with leather hard clay smoothing and coating with a red slip. Samples were retrieved from excavation units AB2, AB3, and AB4.

AB-IId is consistent with petrographic Group 1—the main cluster within the AB assemblage—mainly composed of coarse volcanic rock inclusions (mostly andesites) combined with iron-rich inclusions. End products consisted almost exclusively of unrestricted vessels (CRD), with diameters between 10.0 cm and 25.0 cm and wall thicknesses ranging between 3.5 and 9.0 mm. The only restricted vessel within this group featured walls 8.0 mm thick. Fashioning involved the assembling of coils between 0.7 and 1.6 cm, which were positioned equidistantly in oblique (from inside to outside and vice versa), alternate, and spiral manners, then followed by pinching and drawing. Shaping and finishing was undertaken either on wet or leather hard clay. Surface treatment involved smoothing on leather hard clay, as well as coating with red and brown slips. Sample AB3. C3(2)/AB3.133.3 featured double coating, with a

red slip on top of a white one, while sample AB2. L1(1)2/AB2.22.S1 yielded an annular base (15.0 mm). Samples were fired in a partial to completely oxidized atmosphere at temperatures below 750 °C. The subgroup within this cluster featured a paste composition with increased amounts of natural basaltic inclusions, which was employed for the manufacture of unrestricted vessels (CCC, CSC, CRD) within the same morphometric ranges as the rest of the vessels in the sequence. Coils were slightly larger, between 1.0 and 1.8 cm, but positioned in a similar manner and also featured pinching and drawing—sample AB2.L3(1)/AB2.57.S2, a sample with annular base (15 mm), also shows evidence of possible crushing of coils. The rest of the sequence is similar, featuring both leather hard clay and wet clay shaping and finishing, leather hard clay smoothing, and red slips. Two samples were also burnished. This sequence was present in excavation units AB2, AB3, AB4, and AB6.

AB-IIe matches with petrographic Group 5, with bimodal medium and very coarse volcanic inclusions. The only confirmed end product of this sequence is an unrestricted vessel (CRD) with a diameter of 20.0 cm and a wall thickness of 3.5 mm. A non-identified restricted shape featured a 7.0 mm wall thickness and an annular base 12.0 mm wide (AB2.L1(1)1/AB2.35.S3). Fashioning involved the assembling of coils between 1.3 and 1.5 cm, which were positioned equidistantly and in an oblique manner, with gestures from inside to outside or spirally. Shaping and finishing was undertaken on wet clay (protuberant grains combined with threaded striations and irregular topography). Surface treatment involved smoothing on leather hard clay, as well as coating with a red slip. Samples were fired in a partial to completely oxidized atmosphere at temperatures below 750 °C. Samples were collected from excavation units AB2 and AB3.

AB-IIf is consistent with petrographic Group 7, which is defined by medium to coarse inclusions mainly of volcanic rocks, combined with medium quartz and feldspars. End products consisted of an unidentified unrestricted vessel with wall thickness of 7.5-9.0 mm, a CCo with 5.0 cm diameter and 6.0 mm walls, and a restricted vessel (CCC) with walls 6.0 mm wide. Fashioning involved the assembling of coils between 1.0 and 1.7 cm, which were positioned equidistantly and in an oblique manner, with gestures from outside to inside, then followed by pinching and drawing. The samples diverged regarding shaping and finishing; while one presented wet clay traces, the other evinced leather hard clay techniques. Finishing was undertaken on leather hard clay (inserted grains combined with threaded striations and irregular microtopography). Surface treatment involved coating with a red slip. Samples were too fragmented and eroded to make further interpretations, although one was also burnished. They were fired in a partially to completely oxidized atmosphere at temperatures below 750 °C. Samples belonging to this sequence were excavated exclusively from units AB6 and AB3.

The assemblage from M1 of Aguas Buenas was not integrated into the analysis due to time restrictions. The operational sequences, however, do show overlap with the ones described above. The major differences are the presence of grog tempering (Casale 2017), *ollas* (in minimal quantities), and one modelled vessel within the assemblage of M1. Additionally, M1 does not feature incised *ollas*, annular bases, colanders, or *molcajetes*, which are all diagnostic of the AB2 assemblage.

Outliers within the assemblage displayed similar variability in clay procurement and preparation practices as the sequences described above. Also, fashioning, finishing and surface treatment were coherent with the rest of the sample analyzed. The main differences are the presence of larger vessels of up to 45.0 cm in diameter, as well as the increased occurrence of decoration techniques.

7.3 JOR

Excavations at this site yielded 1079 ceramic fragments (11465.4 grams). In general, fragments were the largest of the dataset, with an average length of 50.7 mm; 55.2% of the sherds were smaller than the average, while 44.8% were larger. There were two distinct groups of vessels regarding wall thickness: the thin ones, which averaged from 4.0 to 7.0 mm wide, and the thick ones, which measured between 8.0 and 13.0 mm. Moreover, 34.0% of the fragments analyzed corresponded to unrestricted vessels, 50.0% to restricted vessels, and the remaining 16.0% to undetermined shapes. The assemblage features several vessel parts, such as rims, rim/necks, shoulders, shoulder/necks, bodies, bases, handles, and supports. Decorating techniques included incisions, punctuations appliqués, *acanaladura*, and slips (almost exclusively red; only one fragment was white-slipped). Other fired clay objects retrieved in

Figure 137: Seal fragment, JOR2.

these excavations include a bead (17.0 mm diameter, 3.5 mm diameter orifice, unpolished surface), a ball of clay (2.3 cm diameter, with two orifices, not clear if related to bead manufacture or another practice, polished), and a seal fragment (grecas and geometric patterns incised, **figure 137**).

Fragmentation was low, and sherds featured angular edges, suggesting breakage not followed by intense erosive processes. Fragments were of quadrangular, trapezoidal, triangular, and irregular shapes, which are typical from assembled elements fashioning, in particular the coiling technique. Also, sherds featured good conservation, light regular surface colors (brown, dark brown, yellowish brown, orange) that imply a good oxidizing firing atmosphere, as well as some fire marks visible on external surfaces. A total of 451 sherds (7966.6 grams) were sampled from the excavation unit for further analysis.

7.3.1 PASTE ANALYSIS

Macrofabric groups

In total, 63 different macrofabric groups were identified in the sample analyzed, as well as several outliers (see **Appendix 10**). Variability was associated with a combination of grain size and certain textural characteristics, so four to five clay recipes were repeated in each grain size, resulting in a homogenous assemblage. These clay recipes

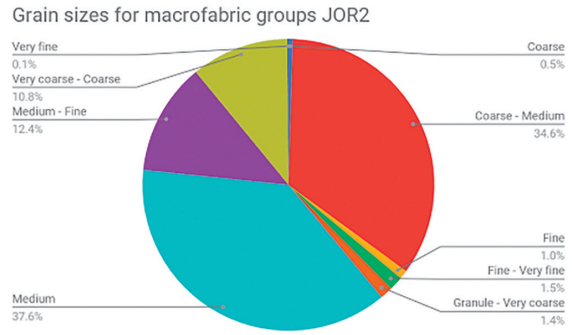

Figure 138: Distribution of grain sizes for macrofabric groups, JOR2.

mainly included feldspars, rock fragments, and quartz, which created ceramic series spanning from granule to very fine despite sharing a similar paste texture, types of inclusions, and voids.

Groups featuring mainly medium grains consisted of 37.6% of the sample, a combination of coarse and medium represented 34.6%, and 10.8% was characterized by very coarse-coarse groups (**figure 138**). Therefore, the samples were characterized as mainly coarse, with an important component of medium grains as well. Frequency of inclusions was ≤ 20.0% in more than 95.0% of the macrofabric groups, so sieving and sorting practices were apparently more common than tempering practices. Apart from that, inclusions tended towards high sphericity and also featured the combination of both high and low sphericity, which points to riverine clay sources with various episodes of transport, both recent and old. The orientation of the inclusions was predominantly chaotic, with oblique and subparallel orientations also occurring, consistent with the coiling technique for preforming vessels. Voids were generally of a plate-like and oval-sphere shape, and their orientation was highly variable, mainly subparallel and oblique.

Regarding firing technology, variability in the core-margin relationship, as well as cross-section and Munsell colors of surfaces, all suggest different temperatures, duration of firing, and position of the vessel (or vessel part) in relationship to the fuel source. These variables explain the range from complete oxidation to different varieties of incomplete oxidation and reduction found in the sample. However, the most remarkable aspect of the

Figure 139: External surface of sample JOR2.95.S1.

Figure 140: Internal surface of sample JOR2.95.S1, featuring charred traces.

assemblage analyzed is the abundance of fire traces that seem to be connected to use-alteration, particularly carbonization processes such as internal encrustrations of charred food as well as external deposition of soot, resulting from the smoke of a fire (Skibo 2013, 190; Forte *et al.* 2018). Apart from occasional dark marks on the external surfaces and more abundant marks on the internal surfaces of vessels, sherds in this assemblage recurrently feature thin, charred encrustations on the internal walls (**figures 139** and **140**). Also, internal carbon deposits were usually transported through the vessel wall, resulting in a cross-section that could be confused with differential firing techniques during the manufacturing process. This phenomenon could be explained, when present on vessel parts connected to the lower body and base, with a wet cooking environment that overboiled, losing moisture and therefore reaching temperatures above 300 °C (Skibo 2013, 191). For upper vessel parts, like shoulders and necks, for example, used in a wet environment (boiling), this could have been the result of food or other materials deposited and charred above the liquid level. Apart from these characteristics, the sample analyzed also showed signs of post-depositional burning, with some sherds charred on old fractures as well as their surfaces.

Since two interphases excavated in JOR2 were interpreted as a possible hearth (IV and IVA), this context may be somehow related to consumption practices involving cooking.[80] However, unlike the rest of the excavation units placed at sites with matching radiocarbon dating results (OP, Sabana Grande, RAI), JOR is the only one that did not yield any zooarchaeological remains. However, the evidence of overboiling cooking practices might partially explain the absence of faunal remains, because cooking bone at such temperatures (above 300 °C) might imply their posterior disintegration (L. Gill, pers. comm.

80 See Chapter 5.3.8.

2019). Therefore, if use-alteration traces on the pots are connected to the lack of faunal remains, then we should think of a cooking context in which the kitchen is kept clean (possibly swiped surfaces), and discard—and maybe also food processing—is done somewhere else. Alternatively, the hearth might have been connected to practices related to the preparation of substances not necessarily related to food, which could explain the contextual differences with the other kitchens excavated. In this sense, it is also important to take into account that the excavation unit was located a few meters away from platform mounds, unlike all the other excavation units related to middens, which were situated right at the foot of the structures. However, units situated within flat, open spaces surrounded by mounds—but away from them, such as OP1, for example—did yield zooarchaeological evidence. Combining all of these possibilities, and of course assuming a possible comparability of the different contexts, we could propose that cooking or preparation of other substances may have taken place off-mound and in between structures—and not necessarily on the open, flat areas surrounded by mounds—while discard was done next to the mounds.

Petrographic Groups

The 26 samples examined through a polarizing light microscope were classified into three petrographic groups, two subgroups, and one outlier (Casale *et al.* 2019). Three samples were impossible to analyze due to a failure during the thin section slide-making procedure that resulting in the ejection of all inclusions.[81] Even though all the groups are connected to volcanic geological settings, their mineralogical content was very distinctive. Also, it seems that paste preparation practices were widespread since all groups show evidence of sieving and sorting practices, as well as the possibility of tempering.

In general, the assemblage analyzed was defined by very coarse, coarse, and medium inclusions of intermediate extrusive igneous rocks (100-1500 µm). Accessory minerals consisted of orthopyroxene (100-300 µm), augite (200-500 µm), quartz (50-1000 µm), iron-rich inclusions (100-500 µm), plagioclase feldspars (50-1000 µm), olivine (50-300 µm) and volcanic ash (100-400 µm). Voids tended towards elongated and vugh shapes (50-250 µm) and did not usually show orientation related to the walls.

81 According to C. Dennett (pers. comm. 2019), this is common in certain ceramics from Rivas.

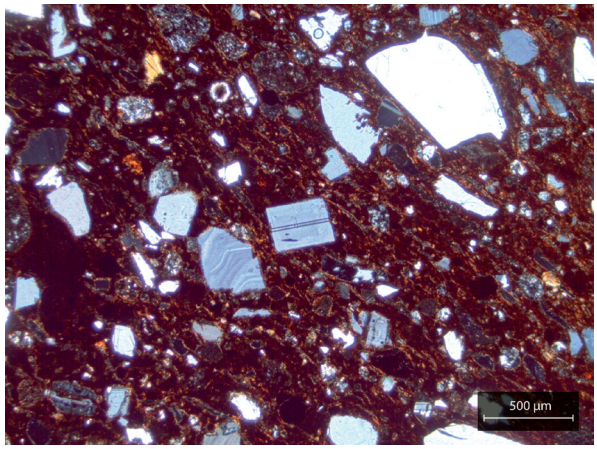

Figure 141: Example of a typical fabric for petrographic Group 1. Sample JOR2.S2(1) was photographed in XP (credit: Simone Casale).

Group 1 (**figure 141**) was characterized by a high frequency of coarse angular to subrounded quartz and plagioclase feldspars (50-1000 µm) in combination with medium-grained intermediate igneous rock fragments (300-500 µm, some coarse up to 1000 µm) connected to andesite, with basalt being absent. Accessory minerals consisted of biotite (100-500 µm), pale yellow olivine (50-100 µm), augite (200-500 µm), and rounded iron-rich inclusions (100-300 µm). Even though it was not possible to assess whether or not some of the inclusions—especially quartz and feldspars—were intentionally added, their angularity and frequency could suggest so. Voids were elongated (150-250 µm) and moderately oriented to the walls. Firing temperature was estimated between 650 and 750 °C.

Group 2, the main cluster within the sample analyzed, is characterized by the combined high frequency of medium to very coarse volcanic rock inclusions between 200-1500 µm, with rare coarse sandstone (500-800 µm), of sedimentary origin, as well as single crystals of quartz (50-400 µm) and plagioclase feldspars (200-600 µm) (**figure 142**). Rock inclusions are divided into two different types, the first of quartz crystals together with interlocked iron minerals, and the second of microphenocrysts of plagioclase, orthopyroxenes and iron minerals. Accessory minerals mainly consist of olivine (50-100 µm). The composition of these fabrics is strongly connected to the Güegüestepe ethnographic sample, but regularity in inclusion sizes suggests the possibility of sieving

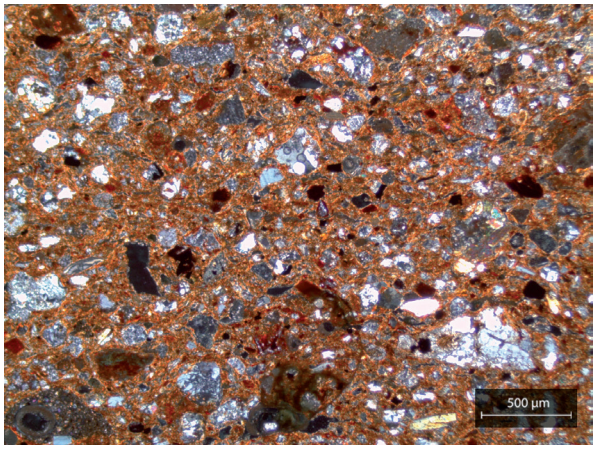

Figure 142: Example of a typical fabric for petrographic Group 2. Sample JOR2.FF4(2) was photographed in XP.

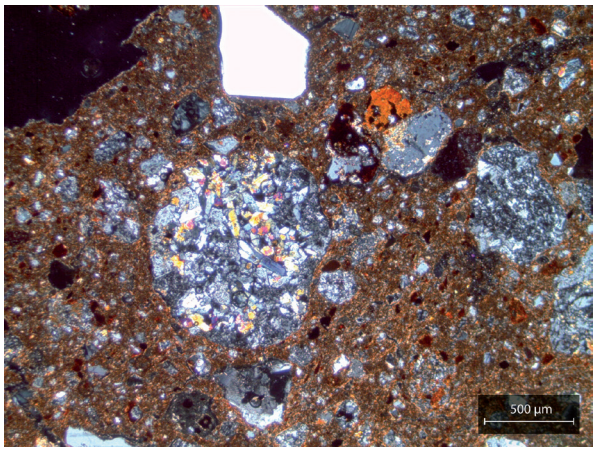

Figure 143: Example of a typical fabric for subgroup within petrographic Group 2 featuring volcanic and sedimentary rock inclusions. Sample JOR2.HH4 was photographed in XP (credit: Simone Casale).

practices. Voids were small and of elongated shape (50-200 µm); vughs were also present, and none were oriented to the walls. Firing temperature was estimated between 650 and 750 °C.

The samples classified within the **subgroup of Group 2** are characterized by volcanic rock inclusions, such as andesite (with microphenocrystals of pyroxene and plagioclase), and basalt in lower frequencies (**figure 143**). Sedimentary rocks, represented by sandstones, were also present, featuring microphenocrysts

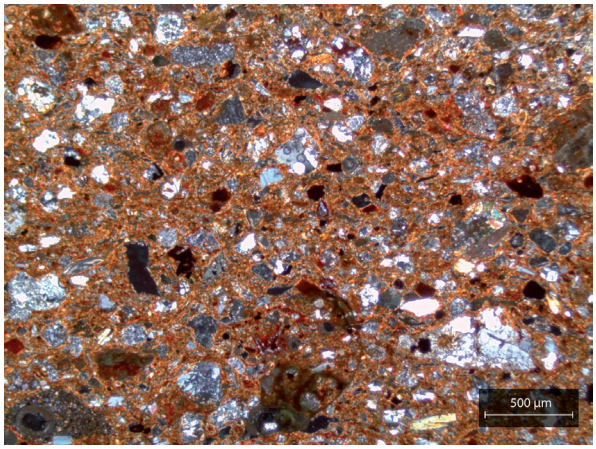

Figure 144: Example of a typical fabric for petrographic Group 3. Sample JOR2.RR4 was photographed in XP.

of quartz. Also, rare quartz crystals (100-400 µm), plagioclase (200-650 µm), and amphibole were identified. Group 2 and its subgroup share mineralogical characteristics; the difference between them is that the main cluster is dominated by both medium-fine and coarse-medium, while the subgroup shows clear preference for medium to coarse inclusions.

Group 3 is dominated by medium to very coarse extrusive intermediate igneous rock fragments (200-1500 µm), mainly made of quartz crystals with iron interlocks; microphenocrysts of plagioclase, orthopyroxenes and iron minerals; basalt with lamellar plagioclase, orthopyroxene, and pale yellow olivine (**figure 144**). Iron-rich minerals (100-500 µm) and clay pellets (200-500 µm) were common, while angular to subangular quartz (150-600 µm) and plagioclase feldspars (100-500 µm) were rare. Accessory minerals were large amphibole (<900 µm), augite (<600 µm), and muscovite/biotite (<700 µm). The absence of single crystals, in contrast to the high frequency of volcanic rock inclusions, may suggest a shorter weathering process and transportation prior to the accumulation and the creation of the deposit but could also be a product of paste preparation practices. Voids were elongated (50-250 µm) and found around coarse inclusions. Firing temperature was estimated between 650 and 750 °C. The **subgroup** within this cluster is characterized by a slightly higher frequency of both quartz and plagioclase feldspars, as well as the presence of olivine (<300 µm) as an accessory mineral. This difference when compared

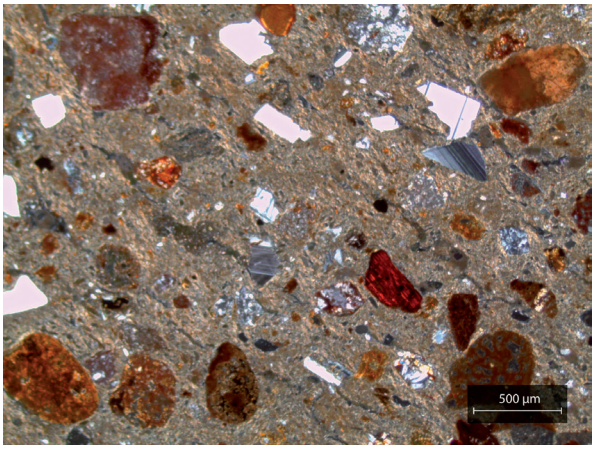

Figure 145: Example of a typical fabric for subgroup within petrographic Group 3. Sample JOR2.E1 was photographed in XP.

to the whole group could be related to tempering practices (**figure 145**).

7.3.2 MACROTRACES OF MANUFACTURING PRACTICES

A general overview of the assemblage suggests preforming through assembled elements based on several lines of evidence. First, the shape of the fragments and orientation of inclusions support coiling as the main fashioning technique, as stated above. Second, topography of several sherds is extremely irregular, with some fragments even featuring undulating surfaces (**figure 146**). Third, coils are visible on the cross-sections of the sherds (**figure 147**).

Figure 146: Example of internal surface with visible coils and preferential fracture (sample JOR2.KKK4).

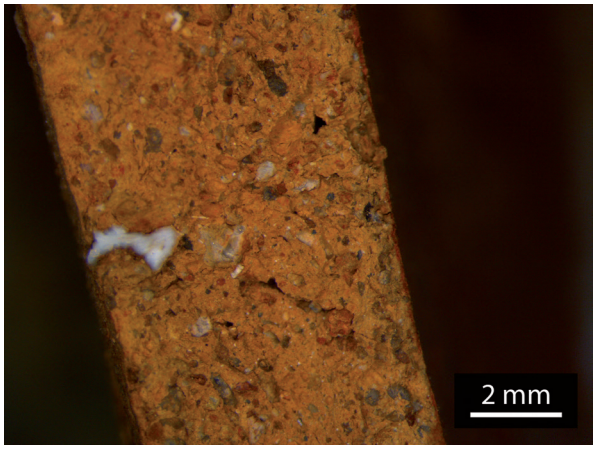

Figure 147: Example of oblique coil juncture visible on the cross-section (sample JOR2.59.1).

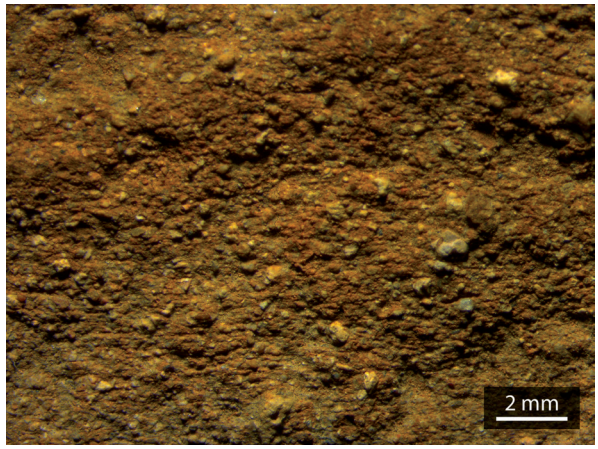

Figure 149: Internal surface of sample JOR2.67, featuring prominent grains in combination with striations, typical of wet clay work.

Figure 148: Internal surface of sample JOR2.R1, featuring the technical diagnostic tool traces common in the JOR2 sample.

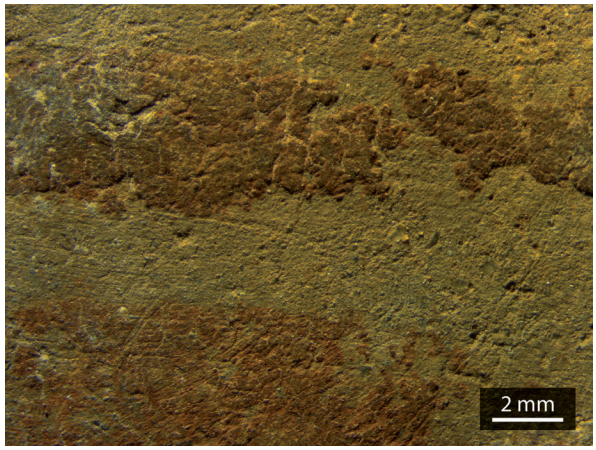

Figure 150: External surface of sample JOR2.25.5, featuring inserted grains and striations typical of leather hard clay work, in combination with a brown slip.

Apart from that, the JOR assemblage is characterized by macroscopic traits related to wet clay preforming, such as the abundance of protuberant and floating grains sensed by simply touching the fragments, combined with visible tool marks that were interpreted as part of the finishing process (**figure 148**). Such marks are usually found, but not exclusively, in the internal walls of the vessels.

Wet clay finishing techniques possibly applied a small tool, as well as hand and finger gestures; the traces related to these practices consist of the combination of protuberant grains with striations and fluid topography (**figure 149**). However, leather hard clay smoothing was also common and is evinced by surfaces with inserted grains and a compact topography that very usually obscures previous steps of the manufacturing sequence (**figure 150**). Coating vessels with slips was a common practice, and some of them were also burnished afterwards.

The 26 samples submitted to petrographic characterization were thoroughly examined for macrotrace identification of manufacturing practices

(see **Appendix 10**). All samples featured fashioning through assembled elements (coils), which measured between 1.0 and 1.5. cm wide in 73.1% of cases (both restricted and unrestricted shapes, wall width between 5.0 and 15.0 mm), while 19.2% ranged between 1.6 and 2.5 cm (mostly unrestricted vessels, wall width 7.0 to 13.0 mm), and the rest had coils measuring below 1.0 cm. Assembled elements were always possible to measure—except for one very small fragment—which, together with very irregular topographies, is a trait that suggests less investment in roughing-out gestures.

Coils were positioned equidistantly and in an oblique fashion (see **figure 147**), either with gestures from the outside to the inside of the vessel (60.0%) or vice versa (40.0%). Bases were possibly assembled positioning the coils as a spiral. Lip coils were always placed with gestures from the outside to inside of the vessels and were generally the same size as body coils, but occasionally bigger or smaller.

Preforming was carried out through pinching and drawing, and all samples except for three featured wet clay finishing, scraping with a tool and/or with the fingers. It is not possible to determine accurately the technique applied or the specific tool since surface treatment practices in leather hard clay erased almost all evidence of finishing gestures. However, identification of prominent grains, combined with striations, suggest wet clay techniques. Striations were frequent, represented in 65.0% of the samples, and were either connected with wet clay finishing gestures or burnishing, leaving distinguishably different traces (see **figures 148, 149,** and **150**). Striations from scraping were usually found in internal surfaces (**see figure 148**), suggesting the use of the tool and possible support with the other hand holding the external surface of the vessel wall. Some samples featured traits that could relate to leather hard clay finishing techniques, but this could not be confirmed due to the erasure of traces caused by surface treatment. Surface treatment consisted of coating with slips and *barbotine*, leather hard clay smoothing, and occasional burnishing. Slips were primarily red, but orange and brown were also identified. Slipped surfaces were very seldomly burnished.

Fragmentation of the sample and absence of full vessels complicates a thorough macrotrace analysis. However, vessels were possibly constructed separating the different sections (base, body, neck/rim), all involving the coiling technique and gestures connected with wet clay roughing out and preforming, followed by leather hard clay surface treatment and firing in oxidized atmospheres without much control.

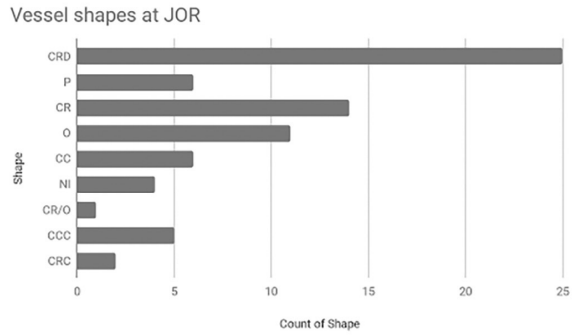

Figure 151: Vessel shapes at JOR2.

7.3.3 MORPHOMETRIC ANALYSIS

Vessel shapes at JOR were homogenous (see **Appendix 10**). Even though the largest group of forms, when analyzing the whole sample, were restricted (**figure 151**), rims overrepresent unrestricted vessels probably due to their higher rim:body ratio. The confirmed unrestricted vessel group was dominated by *ollas*, which measured between 4.0 and 22.0 cm in the diameter of the mouth, with wall thicknesses ranging from 5.0 to 10.0 mm. On average, their diameter was 14.1 cm (63.6% <15.0 cm, and 36.4% >15.0 cm). Within the unrestricted vessel group, the most common shapes are outflaring straight walled jars (CRD), featuring diameters between 8.0 and 45.0 cm (more than 50.0% within the 20.0-25.0 cm diameter rage), with wall thicknesses ranging between 3.5 and 10.5 mm. Straight walled jars (CR) have diameters between 14.0 and 45.0 cm, while their walls range between 5.0 and 10.5 mm in thickness. Curved jars (some convergent) yielded diameters between 20.0 and 35.0 cm, and their walls range between 4.0 and 8.0 mm. Convergent straight walled jars (CRC) measured between 20.0 and 22.0 cm in diameter, and their walls ranged between 5.0 and 6.0 mm. Also, several plates were identified, with diameters between 11.0 and 30.0 cm, and wall thicknesses between 4.0 and 7.5 mm. In summary, 58.1% of the shapes featured diameters between 15.0 and 25.0 cm (mainly CRD, but all shapes represented), 17.5% between 26.0 and 39.0 cm (mainly CR, but also CCC, CRD, and CC),

Figure 152: Circular appliqué decoration, external surface of sample JOR2.62.

Figure 153: Sample JOR1.RR4, featuring incised decoration on the exterior surface, particularly on the shoulder of an *olla*.

9.4% between 10.0 and 14.0 cm (mainly *ollas*, but also CRD, CR, and P), 6.8% had diameters below 9.0 cm (O and CRD), and 5.4% between 40.0 and 45.0 cm (CRD and CR exclusively). In 2.8% of the cases, diameters were not calculated due to the fragmentation of the sample, which consisted exclusively of CRD.

7.3.4 DECORATING TECHNIQUES

Fragments with slipped surfaces—either internal, external, or both—consisted of 44.0%, while other decoration practices were present in only 7.0% of the sample analyzed and consisted mostly of appliqué, paint, incisions impressions, double slip, punctuation,

Figure 154: External surface of sample JOR2. JJJ3, featuring the scar of a support.

Figure 155: Internal surface of sample JOR2. JJJ3 (identified as León punteado), featuring red slip, punctuations, and an *acanaladura* on the

Figure 156: Sample JOR2.68.1, featuring impressions below the rim that are similar to the Carca style rims.

and *acanaladura*. Appliqués were mostly comprised of circular shapes added onto the external walls of unrestricted vessels (diameter between 8 and 11 mm, see **figure 152**), whereas incisions consisted of geometric bands of parallel thin lines (<1 mm) oblique to each other, positioned below the rim, performed with a sharp tool on wet clay (**figure 153**).

Even though incisions were usually performed on the external walls of the vessels, there are some examples of flat vessels that featured the incisions or punctuations on the internal wall of the vessel, suggesting some sort of *molcajete* use, possibly for grinding soft products. Decorating techniques were sometimes applied in combination, such as appliqué with impressions, where coils were added perpendicular to the vessel base and then impressed with the finger or a tool to create circular patterns that resemble a rope. *Acanaladura* was present in two fragments; in the first, it was applied on the lip in combination with punctuation at the center of the internal wall of the vessel (**figures 154** and **155**, identified as the León Punteado type), and in the second example, it was performed to create different surfaces of different wall width.

Figure 157: Sample JOR2.45.5, featuring black paint on a red slip.

Figure 158: Sample JOR2.39, featuring the central coil.

Figure 159: Sample JOR2.39, featuring the two braided coils.

Apart from that, one sample resembled a Carca rim (see left, **figure 156**), but its identification was difficult due to the rough finish of the fragment. Only one sherd featured double slip (red-on-orange), while several fragments showed black paint on red slip (**figure 157**), and one was decorated with parallel bands to the base of brown paint on a white slip. Appendages consisted of a very particular braided handle (**figures 158** and **159**, JOR2.39), manufactured with two coils of 1.4 cm diameter each, which vaguely resembles a diagnostic handle attributed to the Cuapa phase (Gorin 1990, 483, figure VII 91e), as well as another plain cylindrical handle and one cylindrical support.

7.3.5 CERAMIC MANUFACTURING SEQUENCES AT JOR

Based on the data analyzed above, three different manufacturing sequences are proposed for the assemblage excavated at JOR2.

Operational sequence JOR-I

This sequence entails petrographic Group 1, which is characterized by a high frequency of coarse angular quartz and feldspars combined with medium grained intermediate igneous rocks (andesite). The end products of this sequence consist of unrestricted vessels (CC and CRD) with 6.0-7.0 mm walls and 20.0-25.0 cm diameter. Paste preparation apparently involved tempering practices, and then coils of around 1.1 cm wide were positioned equidistantly with gestures both from outside to inside and vice versa. Lip coil was positioned from the outside and was either the same size or smaller than the body. Preforming involved pinching and drawing, followed by wet clay finishing (one sample could have been finished on leather hard clay, but evidence is too fragmentary and surface treatment erased the traces, making it difficult to asses). Surface treatment consisted of leather hard clay smoothing and the application of slips (red and brown). The samples were fired in an incompletely oxidizing atmospheres at temperatures below 750 °C.

Operational sequence JOR-II

This category corresponds to petrographic Group 2 and its subgroup, which are characterized by the combination of both extrusive intermediate volcanic rock and sedimentary rock inclusions, as well as paste preparation practices that might have involved sieving and tempering. After paste preparation, the sequence divides into two subsequences. The first one (JOR-IIa) involves the manufacture of both unrestricted (CR, CC) and restricted (CRC) vessels with a diameter between 20.0 and 28.0 cm and wall thickness between 3.5 and 6.5 mm. The second subsequence (JOR-IIb) focuses on producing both restricted (*ollas*, *tecomates*) and unrestricted (CRD, CR, CC) vessels with diameters between 25.0 and 45.0 cm and wall thicknesses between 7.0 and 13.0 mm. After paste preparation, both subsequences share the same steps, starting with coils between 1.0

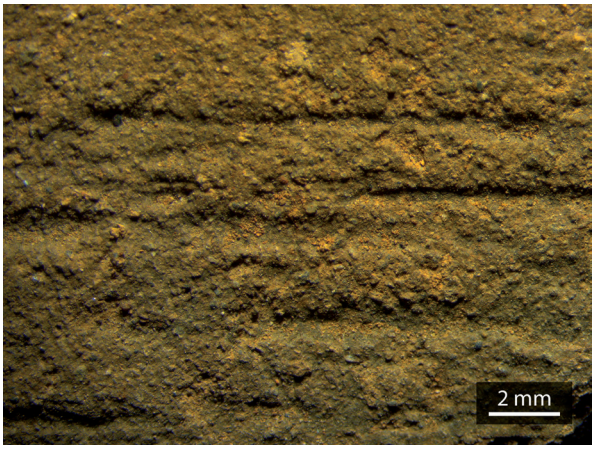

Figure 160: Internal surface of sample JOR2.25.1, featuring traces interpreted as the result of brushing.

and 1.65 cm (only two exceptions, one 0.7 cm and the other one 2.5 cm), which were positioned in an oblique manner, usually from outside to inside gestures, but vice versa in a few cases. Lip coils were placed from outside to inside and were usually the same size as body coils, with some exceptions either larger or smaller. Preforming involved pinching and drawing, done in a manner that left an undulating sherd topography. Finishing was undertaken on wet clay (prominent grains) with an apparent combination of tool and hand/finger use, a technique that usually left striations. Tool marks were exclusive to the internal walls of the vessels, lacking traces on the external surface. This could be related to finishing gestures, such as positioning the tool within the vessel while holding the external surface with the free hand. One sample (**figure 160**) also showed brushing traces, which was observed in a few sherds within the assemblage and were possibly done with straw or a corn cob.

Apart from leather hard clay smoothing, surface treatment also involved the application of a red or brown slip. Bases were apparently fashioned spirally and constructed separately from the vessel body, possibly as a first action. Samples from both subsequences were fired in an incompletely oxidized atmosphere at temperatures ≤750 °C. The most common context in which these samples were excavated were floor surfaces, with a couple of fragments being derived from features (a hearth and a clay deposit).

Operational sequence JOR-III

The JOR-III sequence is associated to petrographic Group 3 and its subgroup, which are characterized by a high frequency of volcanic rock inclusions combined with an absence of single crystals. Paste preparation practices might have involved some tempering, especially within the subgroup. Two different vessel types were built using this paste. The first one included unrestricted vessels (one plate, one non-identified, one possible restricted vessel) with wall thicknesses ranging from 5.5 to 6.0 mm shapes of at least 11.0 cm diameter, and coils between 1.2 and 1.5 cm. The second type of vessel consisted of restricted (*ollas* and NI) and unrestricted vessels (NI) with walls between 9.0 and 15.0 mm, with unknown diameters (one sample was 35.0 cm, but the rest were not large enough fragments to calculate diameters). Coils measured between 1.5 and 2.5 cm. In both vessel types, coils were positioned equidistantly in an oblique manner, usually from inside to outside gestures, but also vice versa in a few cases. Lip coils were placed from outside to inside and were the same size as body coils. Preforming involved pinching and drawing, usually leaving irregular surfaces (with one exception). Finishing was done on wet clay (prominent grains) with the use of a tool, and maybe combined with hand/finger gestures, often leaving striations. Surface treatment involved coating with red slips or *barbotine*, as well as leather hard clay smoothing. One rim was apparently impressed, producing a vague resemblance to the Carca style rims (**see figure 156**). Samples were fired in an incompletely oxidized atmosphere at temperatures ≈750 °C. The dominant context in which these samples were excavated was floor surfaces, with a couple of fragments deriving from features (a hearth and a clay deposit).

The only outlier within the sample analyzed (JOR2.Y3/JOR2.25.5) yielded a completely different operational sequence, with a distinct mineralogical paste composition and roughing-out that involved almost the complete erasure of small coils (0.4 - 0.7 mm)—in contrast to the several sherds featuring extremely irregular surface topographies—followed by unknown fashioning and finishing techniques, the application of parallel bands of brown paint on a white slip, and burnishing of the internal surface.

7.4 OPORTA

The three excavation units placed at the site yielded 1266 ceramic fragments (8130.7 grams). On average, sherds were large, with an average length of 37.8 mm; 53.4% of the sherds were smaller than the average, while 46.6% were larger. Wall thickness averaged between 6.0 and 10.0 mm, with two distinct groups; one ranged between 6.0 and 8.0 mm wide, while a second ranged between 8.0 and 10.0 mm, with extremes exceeding 10.0 mm. Moreover, 34.2% of fragments corresponded to unrestricted vessels, 45.3% to restricted vessels, and the remaining 20.5% to undetermined shapes. The assemblage features several vessel parts, such as rims, rim/necks, shoulders, shoulder/necks, bodies, bases, one handle, and numerous supports. Surface treatment involved coating the vessels with slips, and decorating techniques included incisions, appliqués, punctuation, paint, and impression. Fired clay was also used for making beads as well as clay balls (**figures 161** and **162**). One of the clay balls (**figures 161** and **162**, center) is polished in the outside, features a clean cut in the middle and traces of work in the center, and is similar to the other polished clay ball (**figures 161** and **162**, left) that looks like an unfinished bead due to an orifice. However, this might be due to a flaw in the production process. It is also possible that these two samples were actually employed as tools—polishers, for example. However, the orifice at the center of sample OP1AX5 (**figures 161** and **162**, left) strengthens the bead hypothesis. The distinct finished bead (**figures 161** and **162**, right) is identical to the ones found at La Pachona, both in style and technology, measuring 4.0 mm in diameter and having a 1.0 mm orifice.

Fragmentation was high, and sherds featured subangular and subrounded edges, two characteristics that, when combined, could indicate post-depositional trampling and erosion. Fragments were generally quadrangular, triangular, or trapezoidal in shape, which are typical for assembled elements fashioning, in particular the coiling technique. Also, sherds were relatively well-preserved, with very few eroded surfaces, visible slips (on 77.5% of the sample analyzed) and surface treatment, compact texture, and not breakable by finger pressure. The assemblage featured darker tones than other sites, with generally brown surfaces, and in lower quantities also orange, with light colors (light brown, light orange, yellowish light brown) occurring occasionally. Very rarely, fire marks related to cooking practices were visible on the outside surfaces (less than ten sherds in the whole sample. The assemblage also features several samples with carbonized internal surfaces. Also, some sherds feature a firing atmosphere without oxygen, with very dark cross-sections, as well as differential firing. Additionally, some sherds are so compact that, when hit against each other, they produce a metallic sound. This, together with the lack of fire marks related to production, suggests knowledge of firing conditions, duration, temperature, use of fuel, effects on the end product, and the possible use of some sort of kiln. Therefore, they were possibly fired

Figure 161: Clay balls (left, center) interpreted either as polishers or beads, and a bead identical to the ones recorded at La Pachona (right).

Figure 162: Clay balls (left, center) interpreted either as polishers or beads, and a bead identical to the ones recorded at La Pachona (right).

at low temperatures (approximately 650 to 750 °C) in a controlled environment. A total of 329 sherds (3035.2 grams) were sampled from excavation unit OP1 for further analysis.

7.4.1 PASTE ANALYSIS

Macrofabric groups

The analyzed assemblage was classified into 40 different macrofabric groups that formed several homogeneous ceramic series (see **Appendix 11**). The same clay recipes, which mainly featured feldspars, clay pellets, red and black iron ores, volcanic rock inclusions, quartz, and dark mica, were combined in diverse sizes and textures. The ceramic series span from very coarse to very fine-silt but share similar paste textures, types of inclusions, and voids in the different grain size options. The variability between the clays might be connected to a multiplicity of geologically similar clay sources or to differential paste preparation and firing practices.

The groups were dominated by multimodal, very coarse and coarse grain sizes, with minimum amounts of fine sherds (**figure 163**). Frequency of inclusions was equal or higher than 20.0% in more than 85.0% of the macrofabric groups, and very angular to subangular inclusions were common in the assemblage, so it is possible that sieving and sorting practices were not very common. Also, it is possible that tempering was common in the production of ceramics. Apart from that, inclusions tended towards high sphericity, which points to riverine clay sources with various episodes of transport and erosion, combined with more recent episodes, which could be an alternative explanation for the angularity of inclusions. The orientation of the inclusions was usually subparallel, concentric, and oblique, as well as chaotic, which are consistent with the coiling technique for preforming vessels. Voids were generally of a plate-like and oval-sphere shape, and their orientation was highly variable (mainly subparallel, but also chaotic, horizontal, and oblique in relationship to the vessel walls).

Regarding firing technology, the variability in the core-margin relationship as well as cross-sections and surface Munsell colors suggests different temperatures, duration of firing, and position of the vessel (or vessel part) in relation to the fuel source. This positioning would explain a variability ranging from complete oxidizing atmospheres to different varieties of incomplete oxidation, as well as reductive atmospheres. Even though no kiln structures were identified at the site, after careful examination of vessel

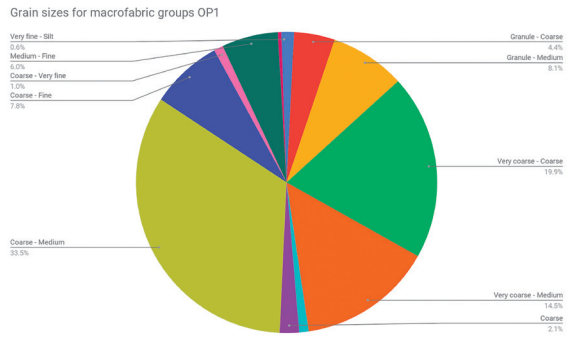

Figure 163: Grain sizes for macrofabric groups OP1.

surfaces and cross-sections, results suggest that firing took place with fuel and fire being separated from the vessels. It could have been in open hearths, but with excellent control of temperature and management of fire, desired temperature and duration to get the expected results. One such example of successful firing technology management is evinced by samples that were perfectly and possibly purposefully smoked exclusively on the inside walls of the vessels, meaning that the pot was fired in an oxidizing atmosphere, but its mouth was either covered or buried upside down for reduction effects. These smoked surfaces were usually burnished, taking advantage of the dark colors achieved. Additionally, other samples appeared to have been covered over after being exposed to an oxidizing atmosphere, reduction of oxygen, and differential firing.

Petrographic Groups

The 23 samples examined through a polarizing light microscope were classified into six petrographic groups, and seven sherds were identified as outliers, since their main characteristics did not match any of the groups. Taking into account the small sample analyzed, variability in paste choices, preparation practices, and firing techniques was relatively high, and it matches the macrofabric assessment, which also pointed to significant variability, with 40 different groups plus outliers identified within a total of only 329 sherds.

In general, the assemblage analyzed was defined by very coarse to coarse inclusions of intermediate igneous rocks (100-4000 µm), both intrusive and extrusive; the former was uncommon not only at this site, but also in comparison to other sites. Accessory minerals consisted of pyroxene (both ortho and

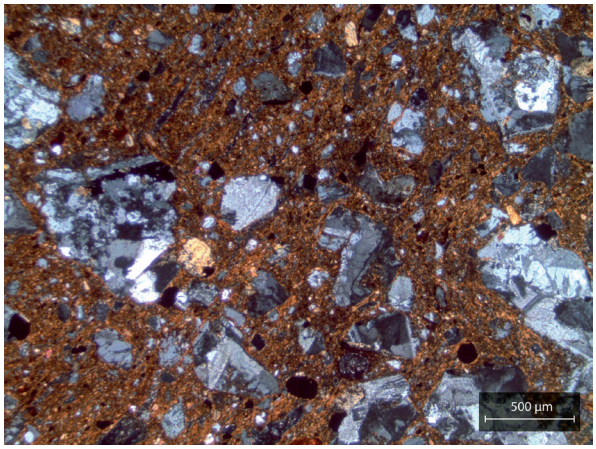

Figure 164: Example of a typical fabric for petrographic Group 1 featuring inclusions with large crystals connected to intrusive igneous rocks. Sample OP1.10.1 was photographed in XP (credit: Simone Casale).

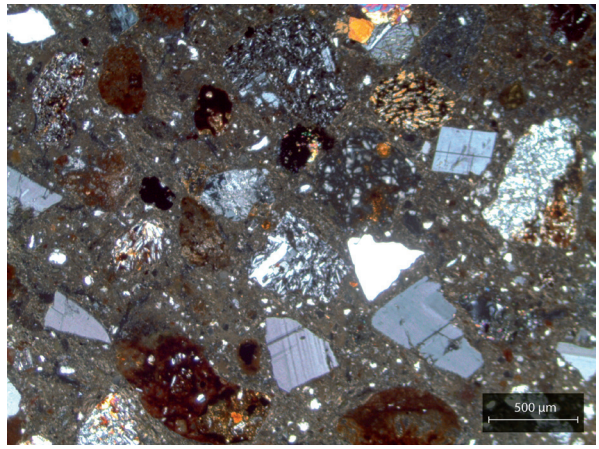

Figure 165: Example of a typical fabric for petrographic Group 2 featuring coarse volcanic rock inclusions, pyroxenes, plagioclase, and quartz. Sample OP1.139.2 was photographed in XP (credit: Simone Casale).

clino, 200-500 µm), quartz (50-1000µm), plagioclase feldspars (100-600 µm), volcanic ash and glass (100-700 µm), and iron-rich inclusions (100-500 µm). Voids tended towards elongated shapes, but vughs and vesicles were also present; orientation was variable, sometimes moderately oriented in relationship to the walls, coils, and coarse inclusions or not oriented.

Group 1 was characterized by a high frequency of very coarse angular and subangular intermediate igneous rock fragments (200-1000 µm, up to 2000 µm), mostly comprised of quartz and feldspars. The combination of the coarse crystals within the inclusions, the yellowish pale olivine, the sericite and the dark minerals—possible spinel—suggest that the inclusions with large crystals are connected to intrusive igneous rocks rather than extrusive, which is a unique characteristic within the sample analyzed (**figure 164**). Within the regional geology, the formations around La Libertad (25 km northeast of Juigalpa) contain intrusive igneous rocks. Apart from that, the fresh fracture of the igneous rocks, together with their high frequency, could suggest tempering practices. In contrast, the fine-grained inclusions seem to be linked to volcanic rocks.

Group 2 is characterized by unsorted intermediate extrusive igneous rocks (100-3000 µm), basalt and andesite, with microphenocrysts of plagioclase and other accessory minerals, such as pyroxene (ortho and clino, 200-500µm), quartz (200-600µm), iron-rich inclusions (100-500 µm), volcanic ash and glass (200-500 µm) (**figure 165**).

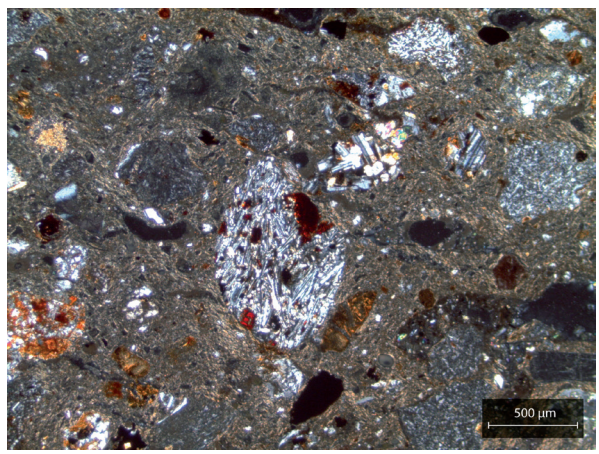

Figure 166: Example of a typical fabric for petrographic Group 3 featuring basalt inclusions with magnetite and titanate, as well as yellow pale olivine. Sample OP1.159 was photographed in XP (credit: Simone Casale).

Group 3 is defined by basalts (300-1400 µm) containing lamellar plagioclase and potassium feldspars, as well as olivine and iron-rich inclusions (200-1000 µm), microphenocrysts of plagioclase and pyroxenes (350-500 µm), coarse quartz, and iron-rich minerals (**figure 166**).

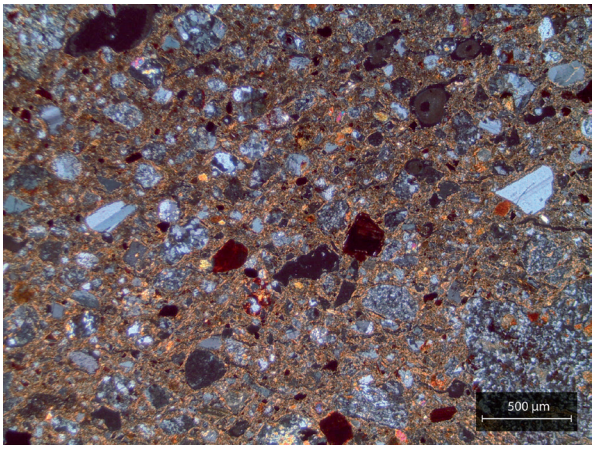

Figure 167: Example of a typical fabric for petrographic Group 4. Sample OP1.169.1 was photographed in XP (credit: Simone Casale).

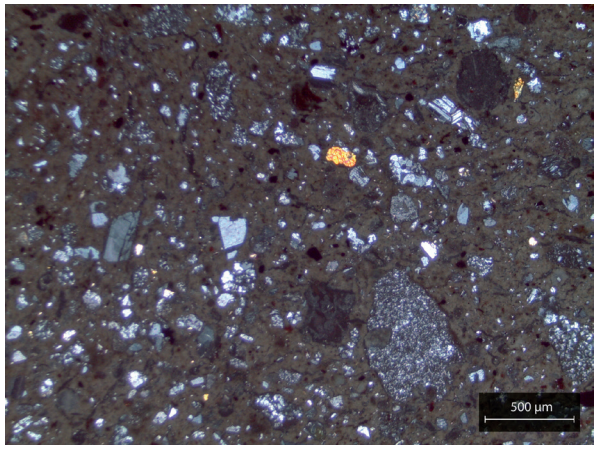

Figure 168: Example of a typical fabric for petrographic Group 5, featuring coarse inclusions with microphenocrysts of quartz, as well as single crystals of quartz, plagioclase, and amphibole. Sample OP1.85.S1 was photographed in XP (credit: Simone Casale).

One of the samples within this group (OP1.65.1) was probably sieved and tempered with coarse basalt fragments. **Group 4** was characterized by basalt inclusions with lamellar plagioclase, pyroxenes and pale yellow olivine (200-1300 µm), microphenocrysts of plagioclase, pyroxenes and globular quartz minerals (300-600 µm). The volcanic inclusions present intergrowth iron-rich minerals (magnetite or spinel). Accessory minerals consisted of olivine (100-200 µm), augite (150-200 µm), pyroxenes (ortho 400-600 µm, clino 150-200 µm), quartz (150-1000 µm), plagioclase euhedral crystals (200-500 µm), and iron-rich inclusions (90-350 µm) (**figure 167**). This petrographic group is connected to the Güegüestepe ethnoarchaeological sample.

Group 5 is characterized by smaller inclusions than the rest of the groups, ranging from medium to coarse sizes (200-800 µm). Samples contained intermediate extrusive igneous rocks, including microphenocrysts of plagioclase and orthopyroxenes (200-4000 µm), quartz (500-800 µm), rare basalt with lamellar plagioclase, olivine, and pyroxenes (600 µm) (**figure 168**). Quartz, potassium, and plagioclase feldspar inclusions—not within volcanic rock ones—featured fresh subangular edges and measured between 200 and 500 µm. Iron-rich inclusions were also present.

Group 6 was characterized by intermediate extrusive igneous rocks associated with inclusions between 200 and 1000 µm, such as polycrystalline quartz with intergrowth dark minerals, olivine, microphenocrysts of plagioclase, pyroxenes, and iron-rich alkali-based olivine rich basalts (200-1500 µm). Inclusions usually showed sericite alteration on their surfaces (**figure 167**). Accessory minerals consisted of iron-rich inclusions (100-500 µm), olivine (100-200 µm), and volcanic ash and glass (200-700 µm) (**figure 169**).

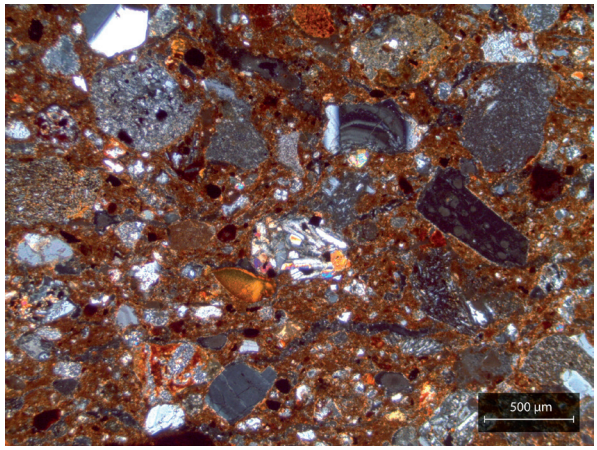

Figure 169: Example of a typical fabric for petrographic Group 6, featuring an alkali-based olivine-rich basalt inclusion, together with volcanic inclusions with microphenocrysts of feldspars. Sample OP1.169.2 was photographed in XP (credit: Simone Casale).

Outliers featured a high variability in their mineral composition (Casale *et al.* 2019), as well as in paste preparation practices. In particular, sieving and tempering practices were observed (i.e. sample OP1.62.1 features grog), as along with traces of hydrothermal alterations in the clay outcrops. Additionally, some samples (OP1.85 and OP1.139.1), with their high contents of volcanic glass and ash respectively, may indicate divergent provenances.

Firing technology was highly variable in the sample. Even though all the petrographic groups featured non-calcareous matrices of different colors, Groups 1, 2, 4, 5, and 6 were optically active, while Group 3 was optically inactive. In addition, outlier OP1.85.1 was slightly active.

7.4.2 MACROTRACES OF MANUFACTURING PRACTICES

An overview of the analyzed assemblage suggests preforming through assembled elements based on several lines of evidence. First, the shape of the fragments and orientation of inclusions supports coiling as the main fashioning technique, as argued above. Second, the topography of the sherds is irregular, thinning and thickening at regular intervals—possibly following the coil's thicker parts. Third, coils are usually visible in cross-sections of the sherds (**figure 170**).

The general first impression of the assemblage suggests a preference for a leather hard clay environment for preforming and surface treatment—evinced by the occurrence of inserted grains, for example. However, it is possible that traces of the earliest steps of the manufacturing sequence were erased by later gestures. After macroscopic inspection of the different macrofabric groups, data pointed to wet clay preforming followed by leather hard clay surface treatment. In particular, the wet clay preforming implied the use of a tool that left wide marks (between 7 and 10 mm wide, gestures parallel to the vessel rim—possibly circular—maybe done with a small scraper) (**figures 171** and **172**). Fine parallel striations (maybe a pumpkin shell or something similar) were also common (**figure 173**). Finally, surface treatment involved, apart from smoothing on leather hard clay as previously stated, coating with clayish slips (**figure 174**) and burnishing.

The 23 samples submitted for petrographic characterization were also thoroughly examined for macrotrace identification of manufacturing practices (see **Appendix 11**). All samples featured fashioning through assembled elements (coils), which measured between 1.0 and 1.5 cm wide in 60.9% of the cases (both restricted and unrestricted shapes, wall width between 4.0 and 9.0 mm), while 26.1% ranged between 1.6 and 2.0 cm (restricted and unrestricted vessels, wall width 7.0-11.0 mm), and 8.7% measured 2.5 cm (restricted vessel, wall thickness 10.0 mm). Coils smaller than 1.0 cm were only identified in 4.3% of the sample (a base with 4.5 mm wall width). Assembled elements could, in all cases, be measured, suggesting less intensity in roughing-out gestures than at other sites, where they are very complex to identify.

Figure 170: Example of visible oblique coil junctures on sample OP1.152.2.

Coils were positioned equidistantly and in an oblique fashion, either with gestures from the outside to the inside of the vessel (52.2%) or vice versa (34.8%), while in 13.0% of cases it was not possible to assess this gesture. Apart from that, lip coils were positioned either from the outside or inside and were generally the same size as body coils but were occasionally smaller. Preforming was carried out through pinching and drawing, and all samples, with the exception of three, featured wet clay finishing, either scraping with a soft tool or with fingers, providing the sherds with a very irregular topography. It is not possible to determine accurately the technique applied or the specific tool used since surface treatment practices in leather hard clay erase almost all evidence of finishing gestures. However, identification of prominent grains combined with striations suggests wet clay techniques. Striations were frequent, represented in 60.9% of the samples, and were either connected with

Figure 171: External surface of sample OP1. C1(1), featuring leather hard clay surface treatment.

Figure 172: Internal surface of sample OP1. C1(1), featuring clear tool marks characteristic of the OP1 sample.

wet clay finishing gestures or burnishing, leaving distinguishably different traces. Striations from scraping were usually—yet not exclusively—found in internal surfaces, suggesting the use of the tool and possible support with the other hand holding the external surface of the vessel wall. Surface treatment consisted of coating with slips or *barbotine*, leather

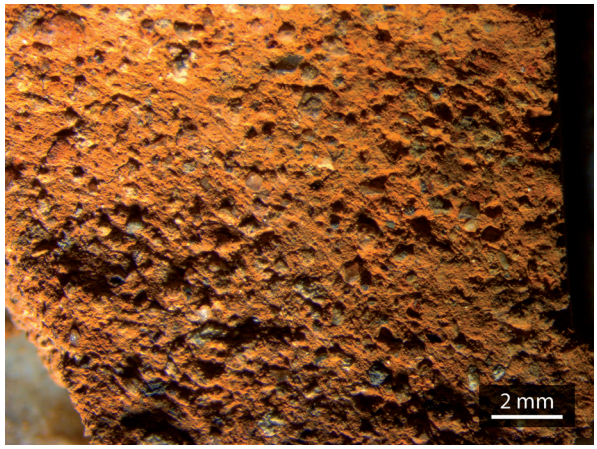

Figure 173: External surface of sample OP1.169.3, featuring prominent grains in combination with threaded striations.

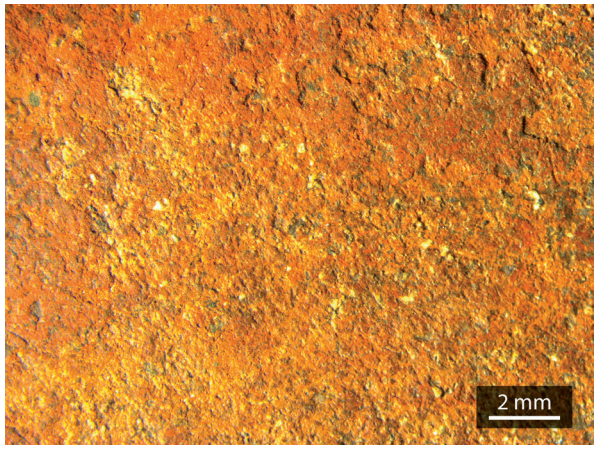

Figure 174: External surface of sample OP1.152.2, featuring inserted grains, compact topography, and red slip.

hard clay smoothing, and burnishing. Slips were usually red, orange, and brown. Slipped surfaces were very seldomly burnished, and there are also sherds that feature burnishing of smoked surfaces.

Fragmentation of the sample and a complete absence of bases large enough to conduct full macrotrace analysis prevents a full reconstruction of the operational sequences of whole vessels. The only base thoroughly analyzed was highly fragmented, but coils were positively identified despite an inconclusive positioning technique, which may have been spiral.

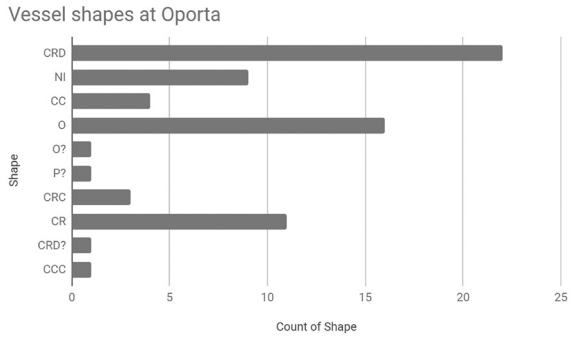

Figure 175: Vessel shapes at Oporta.

7.4.3 MORPHOMETRIC ANALYSIS

Vessel shapes at Oporta were overall homogenous (**figure 175**). The largest group of forms (based on the whole sample, not only the rims), restricted vessels, was dominated by *ollas*, which measured between 6.0 and 34.0 cm in mouth diameter, with wall thicknesses ranging from 3.0 to 9.0 mm. On average, vessel diameter was 19.8 cm (52.9% <20.0 cm and 47.0% >20.0 cm). Within the unrestricted vessel group, the most common shape consisted of outflaring straight walled jars (CRD), which featured diameters between 12.0 and 36.0 cm, while their wall thickness ranged between 3.0 and 11.0 mm. Straight walled jars (CR) had diameters between 4.5 and 31.0 cm, while their walls ranged between 2.0 and 11.5 mm in thickness. Curved jars (one convergent) yielded diameters between 10.0 and 25.0 cm, and their walls ranged 4.0-6.0 mm. Convergent straight walled jars (CRC) measured between 9.0 and 35.0 cm in diameter, and their walls ranged between 5.0 and 8.0 mm. Also, one plate was identified, with a 30.0 cm diameter.

In summary, all shapes—except for the curved jars—featured samples that exceeded 25.0 cm in diameter. At the same time, only the unrestricted jars (CR, CRD, CRC, CC) and *ollas* featured samples with diameters below 15.0 cm. Samples belonging to *molcajetes* were also analyzed (i.e. OP1B.140.S1).

7.4.4 DECORATING TECHNIQUES

Practices related to coating were present in 90.4% of the sample, either on the internal or external walls or both, while other decoration practices were recorded in only 11.9% of the sample analyzed and consisted mostly of incisions, appliqué and appendages, paint, punctuation, impression, and *acanaladura*.

Figure 176: Example of typical incisions found at external surfaces on OP1 sherds, featuring subparallel lines <1mm wide (sample OP1.O4).

Figure 177: Example of sherd incised in the internal wall, suggesting a possible *molcajete* (sample OP1.Q4).

In the case of incisions, they consisted of geometric bands of parallel thin lines (<1 mm) oblique to each other, positioned below the rim and executed with a sharp tool (**figure 176**). Even though incisions were usually performed on the external walls of the vessels, there are some examples of flat vessels that featured incisions on the internal wall of the vessel (**figure 177**), suggesting a *molcajete* use, possibly for grinding soft products.

Figure 178: Carca rim style sherd, sample OP1.31.1.

Decorating techniques were sometimes applied in combination, such as appliqué with punctuation or appliqué with incision. Aesthetic choices for color involved bichrome effects through the combination of paints and slips, such as orange paint on red slip or black paint on red slip. Two sherds also featured very rare bright orange tones, only present as well in the AB2 assemblage. Finally, samples characterized as Carca style rims were present, featuring vertical impressions—possibly digital—right below the rim (**figure 178**).

Appendages consisted of an annular base of small dimensions (6.0 mm diameter for the extra coiled attached to the base), which was the only sample of a base like this at the site; supports featuring circular and conical shapes; and one handle, which was manufactured with one coil.

7.4.5 CERAMIC MANUFACTURING SEQUENCES AT OPORTA

High heterogeneity in clay procurement practices resulted in groups with a very small number of samples, which could in fact belong to the same vessel, so the strength of the groupings should be tested with further sampling. All the samples analyzed involved clays extracted from igneous settings of coarse grain size, but within these mineralogical profiles, clay procurement and preparation practices, finishing, and decorating techniques were variable. OP1 is the excavation unit with the highest petrographic variability within the sample examined for this book. This could be indicative of a special function of the excavated mound or higher technical variability (higher number of producers), either local or exogenous. In spite of the limitations due to the heterogeneity, an attempt to systematize the data was undertaken, in order to reconstruct the manufacturing sequences and find possible relationships between different technical choices and the end products. The result are six different production sequences, as well as an outline of the techniques observed in the outliers.

Operational sequence OP-I

This category corresponds to petrographic Group 1, which is characterized by inclusions of intrusive igneous rocks and paste preparation practices that might have involved tempering. After paste preparation, coils between 1.0 and 1.3 cm were positioned in an oblique manner, either from outside to inside or vice versa. Lip coils were placed from inside to outside and were of the same size as the coils forming the vessel body. Preforming involved pinching and drawing, done in a manner that left the topography of the sherds regular; finishing was undertaken on wet clay (prominent grains) with a technique that left very fine striations, most likely with a soft tool or finger. The internal walls of the vessel featured these traces, while they were absent on the external walls. This could imply a gesture of applying the tool only on one side of the vessel, while the other side is supported by the free hand; however, it is also possible that the tool was applied on both walls, but later leather hard clay finishing techniques on the external surface obscured the traces related to finishing. Apart from this leather hard clay smoothing, surface treatment also involved the application of a red slip. The samples were fired in an incompletely oxidized atmosphere at temperatures around 750 °C. The end product associated to this sequence consisted of curved bowls (CC, Ø 25.0 cm). Wall thickness ranged from 5.0 to 6.0 mm, and the sample was found in an off-mound context.

Operational sequence OP-II

This category corresponds with petrographic Group 2, which is characterized by inclusions related to volcanic igneous rocks, particularly the combination of basalt and andesite. No paste preparation practices were identified. Fashioning involved the assembling of coils between 1.0 and 1.6 cm, which were positioned in an oblique manner, either from outside to inside or vice versa. Preforming involved pinching and drawing; finishing was undertaken on

wet clay (prominent grains) with a technique that did not leave striations, or left very mild ones, so it was possibly performed with the fingers or with a soft tool. However, leather hard clay surface treatment might have erased previous steps of the operational sequence, especially those related to wet clay finishing. Apart from this leather hard clay smoothing, surface treatment also involved the application of a brown slip only on sample OP1.139.2. Additionally, samples OP1.139.2 and OP1.32.1 showed similar "Carca style" decoration, which is comprised of impressions done immediately below the lip with a vertical gesture, measuring 5.0-7.0 by 4.0 mm and with a depth of less than 2.0 mm. Sample OP1.140. S1 featured incised, long, subparallel lines on its internal surface, and as it is a flat sherd, it could be either a *comal* or *molcajete*. Samples were fired in an incompletely oxidized atmosphere at temperatures <750 °C. The end products associated to this sequence consisted of vessels classified with mainly cooking uses, such as O (Ø between 20.0 and 17.0 cm) and MLC. Wall thicknesses ranged from 6.0 to 8.0 mm, and all samples were found in an off-mound context.

Operational sequence OP-III

This operational sequence corresponds to petrographic Group 3, which is characterized by basalt inclusions. Paste preparation practices were heterogeneous; sample OP1.159 featured the mixing of different clays, while OP1.65.1 showed evidence of tempering. Fashioning involved the assembling of coils between 1.0 and 2.5 cm, which were positioned in an oblique manner, either from outside to inside or vice versa. Preforming involved pinching and drawing; sample OP1.159 showed voids following the pinching and drawing gestures on its cross-section, while sample OP1.165.1 yielded an irregular topography. Therefore, preforming traces are clearly visible on the sherds. Finishing was undertaken on wet clay (prominent grains) with a technique that left very mild striations, so it was possibly performed with the fingers or with a small soft tool. However, leather hard clay surface treatment might have erased previous steps of the operational sequence, especially the ones related to wet clay finishing. Apart from this leather hard clay smoothing, surface treatment also involved the application of a brown slip (only on sample OP1.159 on its outside surface, while its interior featured smoking). The samples were fired in an oxidizing atmosphere at temperatures below 750 °C. The end products associated to this sequence consisted of vessels such as a CRD (Ø 22.0 cm) and a restricted vessel, with wall thickness varying between 9.0 and 10.0 mm; all samples were found in off-mound contexts.

Operational sequence OP-IV

This sequence entails petrographic Group 4, which is characterized by inclusions related to volcanic igneous rocks, particularly basalt. No paste preparation practices were identified. Fashioning involved the assembling of coils between 1.5 and 2.4 cm, which were positioned in an oblique manner, either from outside to inside or vice versa. Preforming involved pinching and drawing; finishing is unclear due to leather hard clay surface treatment, which apparently erased previous manufacturing traces. However, it is possible that samples were shaved in leather hard clay, but evidence is insufficient to state this, and sample OP1A.169.S1 might actually prove scraping (wet clay finishing) instead. Therefore, it is possible that finishing gestures in the other samples also implied wet clay techniques but surface treatment obscured them. Apart from this leather hard clay smoothing, surface treatment also involved the application of both brown (external) and red (internal) slips on sample OP1.85.3.2, while sample OP1.169.S1 featured brown slip only. The samples were fired in an incompletely oxidizing atmosphere at temperatures <750 °C. The end products associated to this sequence consisted of vessel shapes divided into two groups: restricted (wall thickness 7.0 mm) and unrestricted vessels (Ø between 16.0 and 35.0 cm, wall thickness between 4.5 and 8.0 mm). This second category allowed for precise shape identification and included a CRD and a CRC. Fragments were both excavated in an off-mound context.

Operational sequence OP-V

This category corresponds to petrographic Group 5, which is characterized by inclusions related to coarse volcanic igneous rocks with the particularity of rare basalt frequency, in combination with finer inclusions and freshly fragmented K-feldspars and plagioclase, which could imply tempering practices. Fashioning involved the assembling of coils between 1.3 and 2.0 cm, which were positioned in an oblique manner, either from outside to inside or vice versa. Preforming involved pinching and drawing; finishing was undertaken on wet clay (prominent grains), with a technique that did not leave striations on sample

OP1B.172 (internal wall) but did leave calabash-like striations on sample OP1.85.S1, Sample OP1B.172 showed the particularity of possibly combining wet clay finishing in its interior with leather hard clay finishing on its exterior wall, most probably shaving. The irregularity of the surface, combined with inserted grains and *festonné* traces, supports that hypothesis. However, leather hard clay surface treatment might have erased previous steps of the operational sequence, especially the ones related to wet clay finishing. Sample OP1.85. S1 consisted of a base, preformed through spiral coiling and with clear pinching marks in its interior. Apart from the leather hard clay smoothing, surface treatment also involved the application of a brown slip only on the exterior surface of sample OP1B.172. The samples were fired in a completely oxidized atmosphere at temperatures <750 °C. Also, sample OP1.85.S1 within this group featured a highly optically active matrix, what could suggest firing temperatures exceeding 700 °C, therefore narrowing the firing temperature to between 700 and 750 °C. The end products associated to this sequence consisted of restricted vessels mainly related to cooking and storage uses, with wall thicknesses ranging from 7.0 to 11.0 mm. Samples were found in both on- and off-mound contexts (OP1B.172 and OP1.85.S1 respectively).

Operational sequence OP-VI

This cluster corresponds to petrographic Group 6, which is characterized by inclusions related to volcanic igneous rocks, particularly olivine-rich basalt. No paste preparation practices were identified. Fashioning involved the assembling of coils between 1.5 and 1.6 cm, which were positioned in an oblique manner with gestures from the outer towards the inner walls of the rough-out. Preforming involved pinching and drawing; finishing was performed on wet clay, involving a scraper applied using curved movements that left clear tool marks parallel to the vessels base with protuberant grains. Sample OP1A.48 shows clear finishing traces of a tool approximately 15.0 mm high. Surface treatment involved leather hard clay smoothing and the application of a brown slip; sample OP1.169.2 featured burnishing as well. The samples were fired in an incompletely oxidizing atmosphere at temperatures <750 °C. Sample OP1.169.2 shows fire marks on its external wall, and some digital pressure on the rim is reminiscent of a Carca rim. The end products associated to this sequence consisted of vessels with wall thicknesses ranging between 9.0 and 15.0 mm, and only one shape was positively identified as an *olla* (Ø 16.0 cm). Vessels were found in both on- and off-mound contexts.

Outliers OP

The samples that could not be grouped within the petrographic clusters were examined separately. In general, they all shared preforming through assembled elements, coils measuring between 0.8 and 1.6 cm, positioned in an oblique manner, either from outside to inside or vice versa, then pinched and drawn. Finishing was possibly performed on wet clay, with one case possibly featuring shaving (leather hard clay). Surface treatments involved leather hard clay smoothing and the application of slips (orange, red, and brown, as well as combinations). Five out of the eight outliers featured decorative techniques. Sample OP1.85 featured the highest quantity of volcanic glass inclusions in the entire analyzed dataset (possibly derived from tempering practices) and was ornamented with the application of clay balls of 6.0-9.0 mm, followed by a punctuation on their surfaces (**figure 179**). One important characteristic of this sample is the presence of protuberant grains underneath the brown slip coating, meaning that leather hard clay smoothing gestures were not performed before the application of the slip, but afterwards.

Sample OP1.62.1, with its paste lacking in basalt and andesite, as well as the addition of grog as temper, featured bands of incised lines (width <1 mm) oblique to the rim and positioned below it and was macroscopically identified as part of the Santa Barbara tradition, from the Ulúa Valley in Honduras (R. Joyce, pers. comm. 2018) (**figure 180**).

Fragment OP1.169.3 is characterized by medium and coarse round volcanic inclusions connected to basalt in combination with angular quartz and plagioclase fragments (temper) and was classified as Cocal phase (R. Joyce, pers. comm. 2018). Sample OP1.85.1 involved paste preparation practices of sieving and tempering, was decorated with black paint on red slip, and is connected to the Sulaco valley in Honduras (R. Joyce, pers. comm. 2018). This relationship between the outliers and ceramics produced in Honduras will be further explored in Chapter 8.

Figure 179: Sample OP1.85, featuring appliqué decoration combined with punctuation, applied on top of a slip that in turn was placed on a wet clay finished external wall.

Figure 180: Sample OP1.62.3, incised *olla* neck identified as part of the Santa Barbara tradition from the Ulúa valley, Honduras.

7.5 BARILLAS

The three excavation units placed at the Barillas site yielded 4249 ceramic fragments (21579.7 grams). In general, fragments were formally homogenous, of large size with an average length of 31.1 mm; 54.0% of the sherds were smaller than the average, while 46.0% were larger. Wall thickness averaged 6.0 mm. Moreover, 74.4% corresponded to unrestricted vessels, 7.3% to restricted vessels, and the remaining 18.3% to undetermined shapes. The assemblage features several vessel parts, such as rims, rim/necks, shoulders, shoulder/necks, bodies, bases, handles, lugs, and supports. Surface treatment involved the coating of the vessels with slips, while decorating techniques included incisions and appliqués in very low quantities, which tended to be zoomorphic.

Fragmentation was high, possibly due to trampling; sherds featured subangular edges, and surfaces were well conserved. Fragments featured triangular, trapezoidal, and quadrangular shapes, which are typical for assembled elements fashioning, in particular the coiling technique. Also, sherds were generally of brown, reddish brown, and orange brown tones, suggesting a well-controlled oxidizing atmosphere, with very few fragments featuring carbonization marks (in both external and internal surfaces). Therefore, they were possibly fired at very low temperatures (<750 °C), perhaps in a hearth. A total of 507 sherds (3460.6 grams) was sampled from excavation UBI1 for further analysis.

7.5.1 PASTE ANALYSIS

Macrofabric groups

In total, 32 different macrofabric groups were identified in the sample analyzed (see **Appendix 12**). Even though this variability might seem high for such a relatively small sample, the different groups were quite homogenous. The same clay recipes, mainly including feldspars, rock fragments, iron ores (both black and reddish-brown), and quartz were repeated in the different grain sizes and textures. This created ceramic series that could span from coarse, coarse/medium, medium/fine, and fine while sharing similar paste textures, types of inclusions, and voids. Apart from a hypothesis related to various clay and or/tempering sources, differences in paste texture among the macrofabric groups could be the result of differential sorting and/or firing practices. For example, the presence and absence of coarse iron ores— also known as *pistolettes* (P. Quinn, pers. comm. 2016)—

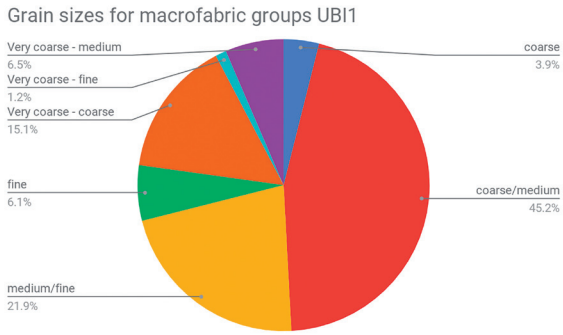

Figure 181: Grain sizes for macrofabric groups UBI1.

seem to be related to sorting or sieving rather than clay sourcing. Also, differential temperature, length of firing, and/or atmosphere can chemically affect the clays and might have caused a single source to result in a more or less porous, granular, or compact texture depending on firing technology. Alternatively, differences could be related to the exploitation of several clay outcrops along the Mayales river, which could explain the microvariability among the paste recipes identified.

Groups featuring mainly coarse grains comprised 49.2% of the sample, while those containing very coarse grains were 22.8%, medium sized 21.9%, and fine 6.1% (**figure 181**). Therefore, the samples were characterized as mainly coarse, with minimum amounts of fine sherds. Frequency of inclusions was lower than 20.0% in more than 90.0% of the macrofabric groups, so sieving and sorting practices were apparently more common than tempering. Apart from that, inclusions tended towards high sphericity, or a combination of both high and low sphericity, which points to riverine clay sources with various episodes of transport, both recent and old. The orientation of the inclusions was usually concentric and oblique, with subparallel, horizontal, and chaotic orientations also occurring. This is consistent with the coiling technique for preforming vessels. Voids were generally of a plate-like and oval-sphere shape, and their orientation was highly variable (mainly oblique, but also subparallel to the walls, concentric, chaotic, and horizontal).

Regarding firing technology, variability in the core-margin relationship as well as cross-section and surface Munsell colors suggest different temperatures, duration of firing, and position of the vessel (or vessel part) in relationship to the fuel source. These variables

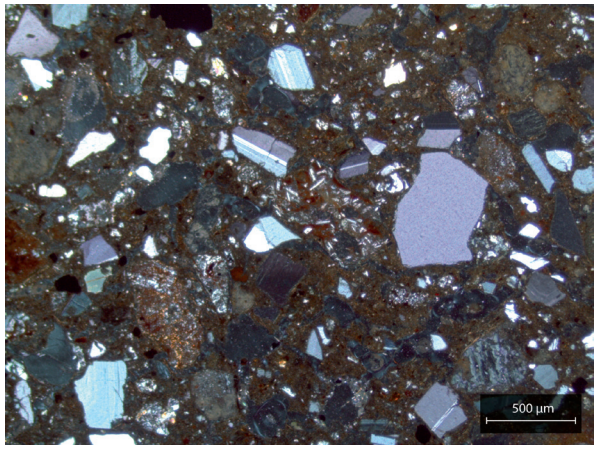

Figure 182: Example of a typical fabric for petrographic Group 1. Sample UBI1.B4.3 was photographed in XP (credit: Simone Casale).

explain the range from complete oxidation to different varieties of incomplete oxidation. The sample lacks reduced fragments, and kilns were not identified during survey nor excavation, so the working hypothesis regarding firing technology at Barillas suggests the use of the domestic hearth in combination with opportunistic outdoor fires for ceramic production.

Petrographic Groups

The 20 samples examined with a polarizing light microscope were classified into six different petrographic groups, as well as two subgroups (Casale *et al.* 2019). It is important to point out that there were no outliers within the sample analyzed, which has implications for later interpretations regarding ceramic production at the site. In general, the composition of the samples—characterized by intermediate extrusive igneous rock (200-1500 µm), featuring accessory minerals such as biotite (100-600 µm), orthopyroxene (100-600 µm) and amphibole (200-400 µm)—was homogeneous and related to the local geology. The main distinguishing characteristic of the assemblage was that all groups (except for Group 5, which was already interpreted as a possible import during its macrofabric characterization as macrofabric Group A) contain lamellar plagioclase with orthopyroxenes and olivine, which corresponds with basalt fragments. The main differences among petrographic groups —except for Group 5—consisted in the frequency of inclusions, which is related not only to clay procurement but also to clay preparation practices, such as tempering, sorting, and sieving. **Groups 1** (**figure 182**) and **4**

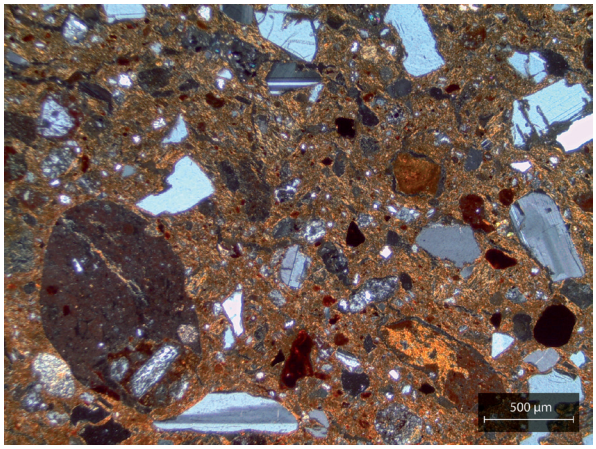

Figure 183: Example of a typical fabric for petrographic Group 4. Sample UBI1.BB1 was photographed in XP (credit: Simone Casale).

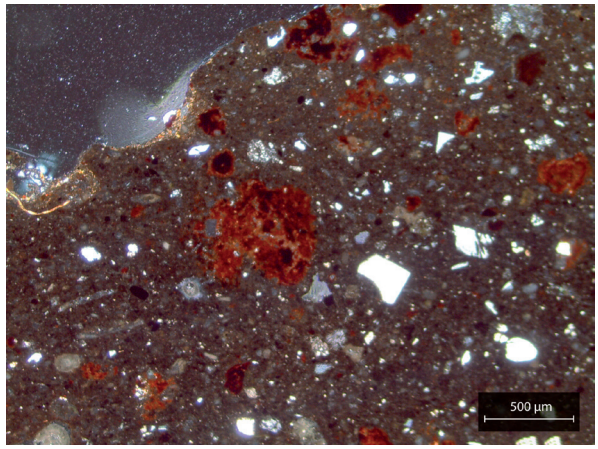

Figure 185: Example of a typical fabric for petrographic Group 5. Sample UBI1.A2 was photographed in XP (credit: Simone Casale).

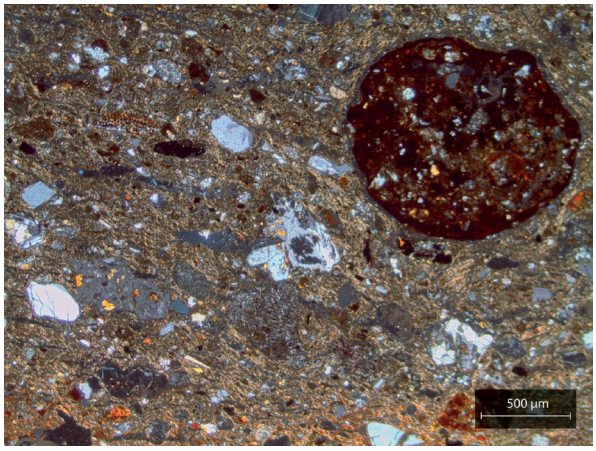

Figure 184: Example of a typical fabric for petrographic Group 3. Sample UBI1.H3 was photographed in XP (credit: Simone Casale).

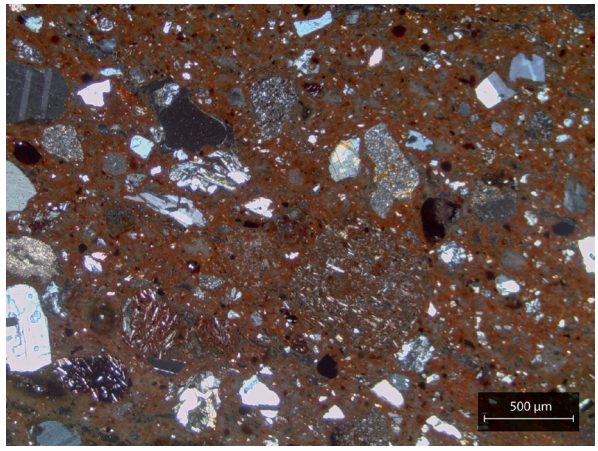

Figure 186: Example of a typical fabric for petrographic Group 2. Sample UBI3.W2 was photographed in XP (credit: Simone Casale).

(**figure 183**), for instance, feature high percentages of quartz (100-1000 µm) and plagioclase feldspar (100-1000 µm) with angular edges, suggesting a fresh fracture in contrast to the rest of the inclusions, which are rounded. Therefore, these dominant inclusions can be interpreted as intentionally added to a more weathered clay matrix.

Moreover, **Group 3** (**figure 184**) yielded compositional similarities to a thin section made as a reference sample from a modern *comal* manufactured at the Güegüestepe community of potters, which procures its clays a few meters away from the village (located less than 2 km south of Barillas), from the banks of the Mayales river, and does not perform any clay preparation besides hydration before production.

In contrast to the rest, **Group 5** (**figure 185**) is composed of a very fine matrix with dominant inclusions of quartz crystals (100-200 µm), clay pellets (100-600 µm), volcanic inclusions (100-300 µm), and powdered olivine, which is spread throughout the matrix. Additionally, volcanic ash (100-1800 µm) is common in all groups except for Group 5, which strengthens the import hypothesis for the latter.

Group 2 (**figure 186**) is characterized by a poorly-sorted matrix with volcanic rock inclusions of

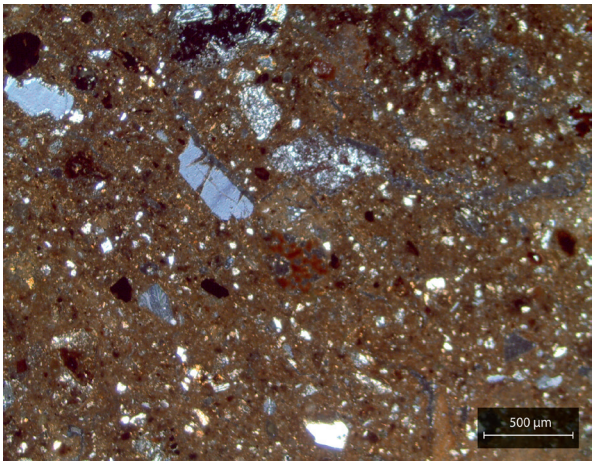

Figure 187: Example of a typical fabric for petrographic Group 6. Sample UBI1.FF1 was photographed in XP (credit: Simone Casale).

angular to rounded intermediate igneous rock (200-3000 µm). These inclusions are varied, featuring microphenocrysts of plagioclase and orthopyroxene with iron-rich inclusions and large crystals of plagioclase, basalt inclusions with lamellar plagioclase, orthopyroxene, pale yellow olivine, and iron-rich inclusions. Apart from that, isolated euhedral to anhedral plagioclase and sanidine (100-600 µm), as well as angular to subrounded, often zoned quartz (50-550 µm) are frequent. Iron-rich inclusions, from rounded to irregular shapes (100-600 µm), are common.

Group 6 (**figure 187**) is characterized by a fine matrix with coarse inclusions, mainly comprising subangular to rounded volcanic intermediate igneous rocks (200-700 µm), with microphencrysts of plagioclase, orthopyroxene and iron-rich minerals (magnetite or titanite). Isolated angular to subrounded quartz and plagioclase (50-100 µm) inclusions are frequent. The fine grain of the matrix suggests possible sieving practices. A subgroup of Group 6 was created for samples lacking sieving traces.

7.5.2 MACROTRACES OF MANUFACTURING PRACTICES

A general overview of the assemblage suggested preforming through assembled elements based on several lines of evidence. First, the shape of the fragments and orientation of inclusions support coiling as the main fashioning technique, as stated in sections above. Second, many sherds show in their cross-sections undulating voids and cracks, sometimes leaving coils visible even in old fractures. This can also be indicative of clay mixing, as well as poor clay preparation techniques, in which, for example, natural organic inclusions were not cleaned before manufacture, or temper is not sufficiently integrated into the clay through kneading. Surface topography of sherds was generally regular, suggesting that the roughing out was followed by careful preforming. Even though the general first impression of the assemblage suggests a preference for a leather hard clay environment for working from preforming through surface treatment—evinced by the occurrence of inserted grains, for example—it is possible that traces of earlier steps were erased by later gestures. However, after macroscopic inspection of the different macrofabric groups, data pointed to wet clay preforming followed by leather hard clay surface treatment. Finally, apart from smoothing on leather hard clay as previously stated, surface treatment involved coating with clayish slips. Post-depositional calcite was found on surfaces, similar to the AB Mound 1 assemblage.

The 20 samples submitted for petrographic characterization were also thoroughly examined for macrotrace identification of manufacturing practices. All samples featured fashioning through assembled elements (coils), which measured between 10.0 and 15.0 mm wide in 75.0% of the cases (all unrestricted shapes, wall width <7.0 mm), while 20.0% ranged between 15 and 20.0 mm (exclusively *comales* shape, wall width 7.0-12.0 mm), 10.0% between 20.0 and 25.0 mm (exclusively *comales* shape, wall width 5.0-10.0 mm) and in 5.0% of cases coils could not be measured. Therefore, it is possible that coil size and wall thickness were related to specific desired characteristics expected from *comales*—heat transfer, for instance—rather than production contexts (Donner *et al.* 2019). Sample UBI1. BIB5.42, an *olla*, evinces that this necessity was not generalized for all cooking vessels, but only for the griddles. The types of foods cooked in the different kinds of containers could explain this discrepancy: for example boiling versus toasting on a griddle.

Coils were positioned equidistantly and either alternatively (45.0%) or obliquely (**figure 188**) (25.0% from inside to outside and 20.0% from outside to inside), while in 5.0% of the cases it was not possible to assess this gesture. Apart from that,

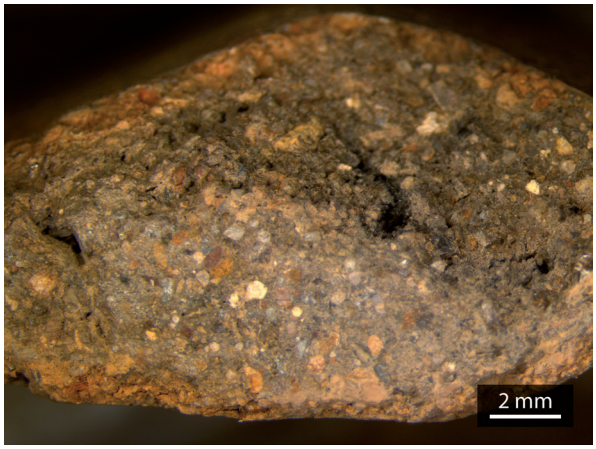

Figure 188: Sample UBI1C.27.4, featuring oblique coil junctures.

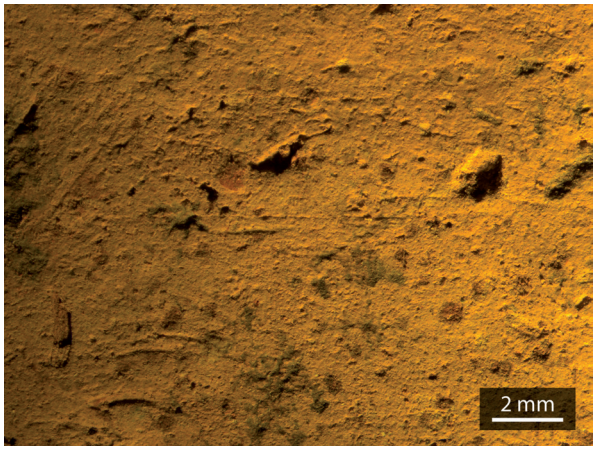

Figure 189: Sample UBI1B.9, featuring prominent grains covered by coating.

lip coils were positioned either from the inside or outside and were generally smaller than the coils of the vessel body. However, there were some cases in which they were either the same size or bigger. Preforming was carried out through pinching and drawing, and all samples featured wet clay finishing, either scraping or with the fingers. It is not possible to determine accurately the technique applied or the specific tool, since surface treatment practices in leather hard clay erased almost all evidence of finishing gestures. However, identification of prominent grains underneath slipped or *barbotine* surfaces suggests wet clay techniques (**figure 189**).

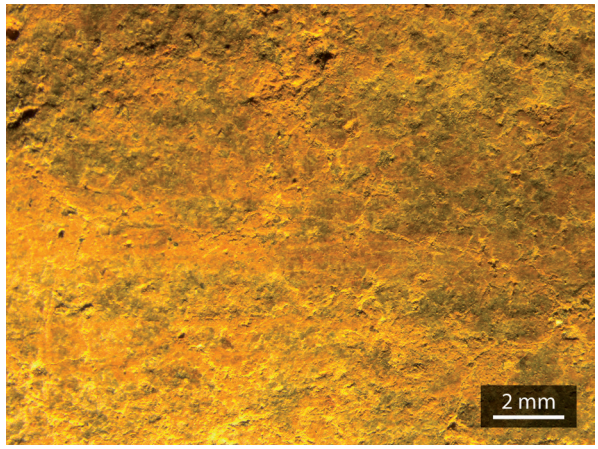

Figure 190: Sample UBI1CXIII5, featuring inserted grains, slip, and a burnished internal surface.

Striations were present in 35.0% of the analyzed samples—mostly associated to leather hard clay surface treatment but some to wet clay finishing—and surface treatment consisted of coating, leather hard clay smoothing, and burnishing (**figure 190**). Slips were usually red, white, reddish brown, and orange, featuring combinations such as red-on-white (the most ubiquitous), black-on-red, black-on-white (UBI1.K3), black-on-white combined with red-on-white (UBI1.N3), white-on-orange (UBI1.N2), and red-on-orange. Slipped surfaces were seldomly burnished, and there are also sherds that feature burnishing of smoked surfaces.

Fragmentation of the sample analyzed does not allow for a full reconstruction of the operational sequences of whole vessels. However, the only base within the sample that was large enough to analyze suggested fashioning technique through coils positioned spirally (UBI1C.27.S1), which coincides with the alternate position of coils on plates and *comales*, which could actually imply spiral coiling and discontinuous finger, nail, and hand pressure combined with drawing gestures. The case of sample UBI1C.27.S1, together with the other base that features differential paste preferences for different vessel parts (UBI1C.27.S2), suggests that bases were manufactured separate from the vessel body, most likely as a first step after slight drying, followed by the fashioning of the body. For cooking pots, necks were possibly applied last after at least minimal drying of the body.

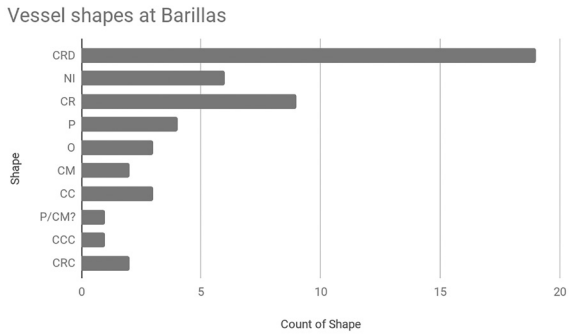

Figure 191: Vessel shapes at Barillas.

Figure 192: Anthropomorphic appliqué, sample UBI1C.25.

7.5.3 MORPHOMETRIC ANALYSIS

Vessel shapes at Barillas were quite homogenous (**figure 191**). The largest group of forms, the unrestricted ones, was dominated by outflaring straight walled jars (CRD), which measured between 11.0 and 40.0 cm diameter, with wall thicknesses ranging from 4.0 to 8.0 mm. On average, their diameter was 27.8 cm (52.7% <20.0 cm and 47.3% >25.0 cm). The second most common shape, straight walled jars (CR), featured diameters between 9.0 and 25.0 cm, while their wall thicknesses ranged between 3.0 and 9.0 mm. Curved jars (CC) had diameters between 13.0 and 25.0 cm, while their walls ranged between 4.0 and 5.5 mm. Convergent straight walled jars (CRD) yielded diameters between 10.0 and 20.0 cm and wall thicknesses ranging from 8.0 to 12.0 mm. The only convergent curved jar (CCC) measured 20.0 cm in diameter, and its walls were 4.5 mm thick. Plates featured a wider range, between 15.0 and 32.0 cm diameter, but their walls were thin (3.5-5.0 mm). The griddles evinced the largest diameters, between 25.0 and 42.0 cm, as well as the thickest walls (9.0-12.0 mm). Regarding restricted vessels, the only ones identified (*ollas*) had mouths between 6.0 and 15.0 cm in diameter, while wall thickness varied from 5.5 to 11.0 mm. In summary, the only shapes that exceeded 25.0 cm in diameter—which is the standard maximum for an individual plate in Western culture, for example—were plates, griddles, and CRD. At the same time, only the unrestricted jars (CR, CRD, CRC, CC) featured samples with diameters below 15.0 cm.

As stated above, most of the sherds lacked fire marks caused by exposure to fire after the manufacturing process, which indicates directly exposing vessels to a cooking fire. However, the griddle fragments were clearly exposed to fire or to heat for longer periods of time, which suggests differential cooking practices. Therefore, use-alteration analysis can shed light on cooking practices; absence of soot on the outer walls of the vessels and of carbonized encrustations within the vessels suggest a preference for cooking practices involving water. However, the underrepresentation of bases in the sample analyzed makes this hypothesis hard to sustain. The sizes of the vessels imply both communal and individual servings, though the sample is too fragmentary to infer specific eating habits.

7.5.4 DECORATING TECHNIQUES

Slipped fragments comprised 66.3% of the samples (either external or internal walls, or both). Other decoration practices were very rare in the assemblage analyzed—representing less than 2.0%—and consisted mostly of appliqué decoration and one case of paint. Sample UBI1C.25 featured an anthropomorphic human face applied to the outside surface of an unrestricted vessel (**figure 192**), while sample UBI1CXIII5 was decorated with a coil featuring incisions possibly performed with human fingernails, creating a rope-like band across the outer surface of the vessel.

Figure 193: Zoomorphic support, sample UBI1B.10.S1 (macrofabric group A, petrographic Group 5).

The other five fragments with appliqué consisted of supports, two zoomorphic UBI1B.10.S1 (**figure 193**) and UBI1C.24 (bird), one cylindrical support (UBI1C.36), two round ones (UBI1B.46.S1 and UBI1C.27.S1), and a modelled one (UBI1C.30). Finally, the only painted and incised fragment (UBI1C.27.4) featured a black band of paint applied parallel to the lip on the rim surface of the unrestricted vessel over a red slip, specifically at the angle of bevelling. Also, this sherd had two wide (1.5 mm) parallel incisions, perpendicular to and right below the lip.

7.5.5 CERAMIC MANUFACTURING SEQUENCES AT BARILLAS

The mineralogy of all clays studied suggests provenance connected to a volcanic environment, which coincides with the geology of the research area. In spite of this, intermediate igneous rocks of volcanic origin are common beyond the local geological unit, so variability in techniques and gestures might elucidate questions regarding production loci. Also, the lack of outliers in the sample analyzed supports homogeneity both in local production and in networks of practices. When taking into account the whole production process, from raw material procurement practices through the end product and its uses—with the limitations that this study has regarding function—it is possible to distinguish four different technological groups, of which two contain a subsequence.

Operational sequence Barillas-I

This category corresponds with petrographic Group 1 and is characterized by a non-calcareous clay matrix with very coarse to coarse grain size

inclusions, which was subjected to the addition in high percentage (>30.0%) of angular fragments of quartz, plagioclase and alkali (sanidine) feldspars of different dimensions. In a lower frequency, coarse and medium sized inclusions of intermediate igneous rock fragments are present, especially featuring quartz crystals, microphenocrysts of plagioclase, orthopyroxenes and iron minerals—such as magnetite or titanite. Additionally, samples contain lamellar quartz. Paste preparation varied, possibly depending on the expected end product; for example, sample UBI1.B1 (an *olla*) contained the same type of temper but in a slightly lower frequency, which could be connected to functional choices.

After paste preparation, roughing out was very homogeneous, featuring wet clay techniques such as pinching, drawing, and finishing—most likely with hands, fingers, and nails. No clear tool marks were identified, which could be a consequence of the erasure of traces caused by later steps involving leather hard clay smoothing. Coils between 1.5 and 2.5 cm were positioned in an alternate manner; in the case of the *comales,* it is probable that they were formed through spiral coiling. Lip coils were always smaller than the coils forming the vessel body, and all samples were fired in an oxidized atmosphere—ranging from complete to partially oxidized—at temperatures below 750 °C. The end products associated with this sequence consisted of vessels with mainly cooking uses, such as *comales* (Ø between 25.0-42.0 cm) and *ollas*; the latter could also serve other purposes. Wall thicknesses ranged from 5.0 to 11.0 mm, and the *olla* yielded thinner walls than the *comales*. All samples were found in off-mound contexts.

Operational sequence Barillas-II

Samples classified within sequence Barillas-II correspond to petrographic Group 3, which consists of a fabric strongly related to the Güegüestepe ethnographic sample (see 7.8). This is not surprising, since Barillas is located only 2 km northwest of the clay outcrop used nowadays. Therefore, these fabrics were characterized by intermediate volcanic igneous rock inclusions of medium to coarse grain sizes of subangular to subrounded shapes, which suggests they were the product of natural weathering processes. This hypothesis is strengthened by the extensive presence of sericitic alteration on the surface of inclusions, which is caused by hydrothermal alteration. However, clay preparation might have involved sieving practices in the case of samples UBI1.S2 (unrestricted vessel) and UBI1.E4 (restricted vessel).

As with the previous group, roughing out was very homogeneous and featured wet clay techniques such as pinching, drawing, and finishing—most likely with hands, fingers, and nails. No clear tool marks were identified, but this could have resulted from the erasure of traces caused by later steps involving leather hard clay smoothing. Coils between 1.0 and 1.5 cm—considerably smaller than in the Barillas-I sequence—were positioned in either an alternate or oblique (outside to inside or inside to outside) manner. Lip coils were both larger or smaller than the coils forming the vessel body. Surface treatment consisted of leather hard clay smoothing, as well as slips (red, brown, and orange), and sample UBI1. H3 was also burnished. Regarding firing technique, all samples were fired in an incompletely oxidized atmosphere—ranging from completely to partially oxidized—at temperatures below 750 °C. The end products in this sequence consisted of vessels associated with serving and storage practices, such as jars with outflaring straight walls (Ø 18.0 cm), straight walls (Ø 10.0 cm), or curved-convergent walls (Ø 20.0 cm). Wall thickness ranged from 4.5 to 7.0 mm. Apart from that, all samples were found in mound contexts.

Within this sequence, there is a subgroup that deviates after clay procurement because it shows very coarse to medium angular inclusions of quartz and plagioclase feldspars that imply tempering practices. The fabric is also characterized by inclusions of volcanic origin, mainly comprised of intermediate igneous rocks with microphenocrysts of plagioclase. Tempering materials in sample UBI1.U2 (CRD) were coarser than within the rest of the group. Fashioning and firing techniques, as well as surface treatments, coincided with the rest of the sequence. The two end products positively identified within this sequence were an outflaring straight walled jar (Ø 20.0 cm) and an *olla* (Ø 7.5 cm); a third shape, possibly unrestricted, consisted of a base with an appliqué round support. Wall thickness ranged between 5.5 and 7.0 mm. These shapes were associated with serving—especially in the case of the unrestricted vessels—and to cooking and storing practices. The first sample was excavated from a mound context, while the *olla* was retrieved off-mound.

Operational sequence Barillas-III

The Barillas-III sequence is associated with petrographic Group 5 and macrofabric Group A, which are characterized by a very fine non-calcareous matrix, featuring only quartz crystals, clay pellets, and powdered olivine. Fabric indicated either a fine clay outcrop or sieving practices followed by possible tempering. Absence of intermediate volcanic igneous rocks could be connected to sieving or provenance.

As with the previous two groups, roughing out was homogeneous, featuring wet clay techniques such as pinching, drawing, and finishing, most likely with hands, fingers, and nails. No clear tool marks were identified, but this could have resulted from the erasure of traces caused by the high erosion suffered by the sherds, which is related to their "powdery" texture, possibly connected to fabric texture. Coils, including lip, of 1.0 cm were positioned in either an alternate or oblique (inside to outside) manner. Surface treatment consisted of leather hard clay smoothing, as well as slips (orange and brown). Regarding firing technique, the two samples studied under the polarizing microscope showed divergent practices. Sample UBI1BIB5.9 was fired in a completely oxidizing atmosphere, and since its matrix is not optically active, it is possible that it was fired for a longer period of time at a higher temperature, or the vessel was gradually heated and fired for a longer period than the rest of the sherds (Degryse & Braekmans 2017, 259). In contrast, sample UBI1B.46.S1 was fired in a partially oxidizing atmosphere, and its matrix is optically inactive, suggesting firing conditions more similar to the rest of the samples analyzed. Both samples consisted of vessels associated with serving, cooking, and storage practices, such as jars with outflaring straight walls (Ø 20.0 cm). Wall thickness ranged from 5.0 to 5.5 mm. Apart from that, all samples were found in off-mound contexts. Decoration within this group consisted of applied supports, both zoomorphic and geometric.

Operational sequence Barillas-IV

Regarding clay procurement practices, the Barillas-IV sequence includes both petrographic Groups 6 and its subgroup. However, the operational sequence of manufacturing vessels with clay from this origin diverged at the paste preparation step. Samples classified within petrographic subgroup 6 are characterized by very coarse-grained inclusions of volcanic intermediate igneous origin combined with quartz and plagioclase, which, due to their shapes, were interpreted as a natural product of weathering processes. As in the previous groups, roughing out was very homogeneous and featured wet clay techniques such as pinching, drawing, and finishing—most likely with hands, fingers, and nails. No clear tool marks were identified, but this could have resulted from the erasure of traces caused by later steps involving leather hard clay smoothing. Coils between 1.0 and 1.1 cm were positioned in either an alternate or oblique (outside to inside) manner. Lip coils were of the same size as the coils forming the vessel body. Surface treatment consisted of leather hard clay smoothing, as well as slips (red, brown), and sample UBI1C.27.4 featured two decorative techniques: paint (black) and incisions. Regarding firing techniques, samples were fired in an incompletely oxidized atmosphere—ranging from complete to partially oxidized—at temperatures below 750 °C. The end products in this sequence consisted of unrestricted vessels associated with serving and storage practices, and wall thicknesses ranged from 4.5 to 6.0 mm. Apart from that, all samples were found in mound contexts.

Petrographic Group 6, on the other hand, diverges from the previous subgroup within the same manufacturing sequence due to its differential paste preparation practices, which consisted of sieving or sorting. The fabric is also characterized by volcanic intermediate igneous rock combined with quartz and plagioclase feldspars. Sample UBI1C.27.S2 features clay mixing, with one coarser clay—possibly not sieved—used for the vessel wall and a finer one used for the base.

Roughing out, surface treatment, and firing technique coincide with the rest of this sequence, but they also involved burnishing external surfaces of vessels. Coils measured between 1.2 and 1.8 cm and were positioned in either alternate or oblique (outside to inside) manners. Lip coils were of the same size or smaller than the coils forming the vessel body. The end products in this subsequence consisted of unrestricted vessels such as plates, straight walled jars, and outflaring straight walled jars. Only one vessel diameter was measurable—25.0 cm for a straight walled jar—and wall thickness ranged from 5.0 to 7.0 mm. Apart from that, as in the rest of Barillas-IV sequence, all samples were found in mound contexts.

Figure 194: Sample RDO2.F1, featuring deposition of soot on the external wall of the vessel.

7.6 ROSA DOLORES OPORTA

Ceramics collected at RDO will be described per excavation unit, since the two contexts within the site yielded very dissimilar radiocarbon dates. To begin with, 100 ceramic fragments (833.5 grams) were retrieved from excavation unit **RDO1**. In general, fragments were of medium size, with an average length of 33.5 mm; 39.0% of the sherds were smaller than the average, while 61.0% were larger. Wall thickness averaged between 6.0 and 8.0 mm, with isolated thin (4.0 mm) and wider (10.0 mm) samples. Moreover, 34.0% corresponded to unrestricted vessels, 38.0% to restricted vessels, and the remaining 28.0% to undetermined shapes. The assemblage features several vessel parts, such as rims, rim/necks, shoulders, bodies, and bases. Surface treatment involved coating with red slips, while decorating techniques included incisions, appliqués, and punctuation on appliqué bands.

Fragmentation was moderate, and sherds featured subangular edges, which could indicate trampling. Fragments were of quadrangular and triangular shapes, which are typical of assembled elements fashioning, in particular the coiling technique. Also, sherds were usually brown in color, with some occurences of orange and lighter colors, featuring no fire marks visible on outer surfaces but some smoking and charred residues on the internal walls. Therefore, they were possibly fired in oxidizing atmospheres at low temperatures (approximately 750 °C).

Excavation unit **RDO2** yielded 172 ceramic fragments (1194.9 grams). In general, fragments were of medium size, with an average length of 37.5 mm; 52.0% of the sherds were smaller than the average, while 48.0% were larger. Wall thickness should be divided into two groups. The first one averaged 5.0 mm and consisted mostly of unrestricted vessels, while the second one averaged 8.0 mm and was comprised of restricted vessels. In general, 45.0% of the fragments corresponded to unrestricted vessels, 25.0% to restricted vessels, and the remaining 30.0% to undetermined shapes. The assemblage features several vessel parts, such as rims, rim/necks, necks, bodies, bases, and supports. Decorating techniques included incisions, appliqués, and red slips.

Fragmentation was moderate, with sherds featuring subangular to angular edges and eroded surfaces, which could indicate trampling. Fragments were of quadrangular, trapezoidal, and triangular shapes, which are typical of assembled elements fashioning, in particular the coiling technique. Also, sherds were

of brown tones with some occurence of orange and lighter colors. Therefore, they were possibly fired at low temperatures (approximately 750 °C) in an oxidizing atmosphere. Also, some sherds feature carbonization in the internal surface, as well as soot deposition outside (**figure 194**), which is consistent with cooking practices. However, sherds with use-alteration are less frequent than in excavation unit RDO1. Besides, no post-depositional fire was identified, except for one sherd. A total of 109 sherds (1419.5 grams) were sampled from both excavation units for further analysis.

7.6.1 PASTE ANALYSIS

Macrofabric groups

Excavation unit RDO1

In total, nine different macrofabric groups were identified in the sample analyzed, as well as several outliers (see **Appendix 13**). Even though this could be interpreted as a high variability rate in comparison with the number of sherds examined, the groups can actually be clustered in two main ceramic series, in which certain clay recipes—mainly containing feldspars, rock fragments and quartz as inclusions—were repeated in the different textures, types of inclusions and voids, resulting in a homogenous assemblage.

Groups featuring mainly coarse grains consisted of 64.8% of the sample, while the ones containing medium grains comprised 35.2% (**figure 195**). It is important to mention that no fine or very coarse groups were identified. Frequency of inclusions was low in comparison to other sites, with most of the sherds (55.0%) featuring frequencies of inclusions between 5.0 and 10.0%, and no group exceeded 25.0%. Therefore, either clay procurement involved a preference for naturally finer clays, or sieving and sorting practices were more common than tempering practices. Apart from that, inclusions tended towards low sphericity, with one group as an exception (RDO1.G), which yielded a combination of both high and low sphericity, which points to either riverine clay sources with various episodes of transport, both recent and old, or tempering practices. The orientation of the inclusions was usually oblique and chaotic, which is consistent with the coiling technique for preforming vessels. Voids were generally of a plate-like and irregular shape, with few oval-sphere examples, and their orientation was highly variable, mainly subparallel, chaotic and oblique.

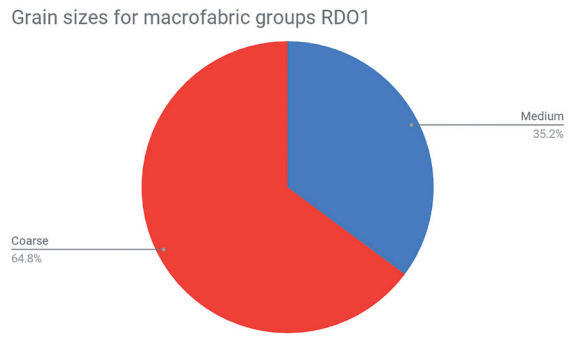

Figure 195: Grain sizes for macrofabric groups RDO1.

Regarding firing technology, variability in the core-margin relationship as well as cross-section and surface Munsell colors suggest different temperatures, duration of firing, and position of the vessel (or vessel part) in relationship to the fuel source. These variables explain the range found in the sample from complete oxidation to different varieties of incomplete oxidation.

In relationship to vessel use, the assemblage contained fire traces that seem to be connected to use-alteration analysis, particularly carbonization processes such as carbonization in the inside of the vessels, with no soot on the outside wall, and in some cases with transfer of charred remains into the walls. These traces connect the pots with intensive cooking activities.

Apart from the above, several sherds feature post-depositional fire traces, evinced by carbonization deposited on old fractures. This trait is consistent with the stratigraphy of RDO1, which featured at least three stratigraphy units (SXIV, SXV, and SXVI) that were related to a hearth, as well as two layers (SXI and SX) that were intentionally burnt for construction purposes.

Excavation unit RDO2

In total, eleven different macrofabric groups were identified in the sample analyzed, as well as two outliers (see **Appendix 13)**. As in excavation unit RDO1, this variability is relative, since the groups can actually be clustered into three main ceramic series, in which certain clay recipes—mainly containing feldspars, rock fragments and quartz as inclusions—were repeated in the different

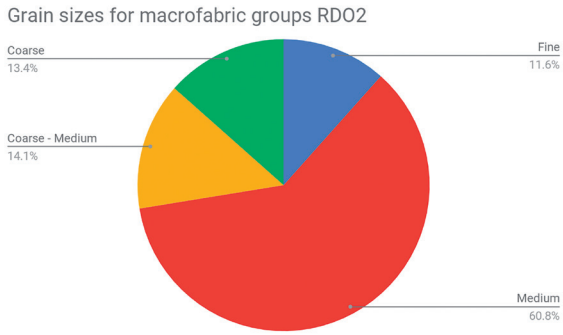

Figure 196: Grain sizes for macrofabric groups RDO2.

textures, types of inclusions and voids, resulting in a homogenous assemblage.

Groups featuring mainly coarse grains consisted of 13.4% of the sample, the ones containing medium grains were 60.8%, coarse-medium sherds represented 14.1% of the total, while fine groups comprised 11.6% (**figure 196**). In contrast to excavation unit RDO1, groups featuring fine grained ceramics were present in RDO2, and the majority of samples were medium instead of coarse. Frequency of inclusions was equal to or below 20.0% in most cases (80.0% of the total), and no group exceeded 25.0%. When compared to RDO1, with most of its groups featuring 10.0% or less, frequency of inclusions was higher in RDO2 (15.0%). Therefore, either clay procurement involved a preference for clays naturally containing higher amounts of inclusions, sieving was more prevalent in RDO1, or tempering practices in RDO2 were more common. Apart from that, inclusions tended towards a combination of both high and low sphericity, which could partially support the tempering hypothesis. However, some groups also featured either low or high sphericity—the latter being consistent with tempering practices. The orientation of the inclusions was usually oblique and chaotic, which are characteristic of the coiling technique for preforming vessels. Voids were generally of irregular, oval-sphere, or plate-like shape, and their orientations were usually chaotic and oblique.

Regarding firing technology, variability in the core-margin relationship as well as cross-section and surface Munsell colors suggest different temperatures, duration of firing, and position of the vessel (or vessel part) in relation to the fuel source. These variables explain the range from complete oxidation to different varieties of incomplete oxidation found in the sample. Regarding vessel use, the assemblage featured fire traces that seem to be connected to use-alteration analysis, but in much lower frequency than excavation unit RDO1. For example, sample RDO2.G shows soot on its external wall combined with internal carbonization. However, samples with cooking traces within the assemblage are minimal. Additionally, and in contrast to excavation unit RDO1, no post-depositional fire traces were identified.

Petrographic Groups

Since the differences found in the macrofabric analysis of the assemblages excavated from units RDO1 and RDO2 were interpreted mostly as contextual and/or functional, but not temporal, samples were mixed for petrographic characterization, and the results were assessed taking into account the rest of the analytical tools.

The 15 samples examined using a polarizing light microscope were classified into three petrographic groups, two subgroups, as well as one outlier (Casale *et al.* 2019). Even though all the groups are connected to volcanic geological settings, their mineralogical content was very distinctive regarding frequencies of certain inclusions and texture. Also, it seems that paste preparation practices were not common, since only one sample (RDO2.I2, **figure 197**) evinced possible sieving practices. Tempering was apparently not present, and clays might have been used without the addition or extraction of materials from the natural outcrop. However, certain characteristics present in Group 2 (see below) might also indicate sieving practices. In general, the assemblage analyzed was defined by very coarse, coarse, medium, and fine inclusions of intermediate igneous rocks (200-1000 µm). The most common inclusions consisted of quartz (100-550 µm), plagioclase feldspars (100-1000 µm), and volcanic ash (100-2000 µm). Accessory minerals were considerably less frequent than these three main inclusions but were present in all groups, comprised of clino and orthopyroxene (150-600 µm), muscovite (50-300 µm), iron-rich inclusions (100-300 µm, which are common in Group 2), and olivine (50-400 µm). Volcanic ash (200-600 µm) was minimally present in Groups 2 and 3 but absent in Group 1. Voids (100-250 µm) tended towards meso-elongated and meso-vugh shapes and were not usually oriented to vessel walls.

Group 1 was characterized by a reddish-brown matrix dominated by a high frequency of angular to rounded quartz (100-800 µm) and plagioclase feldspars (100-

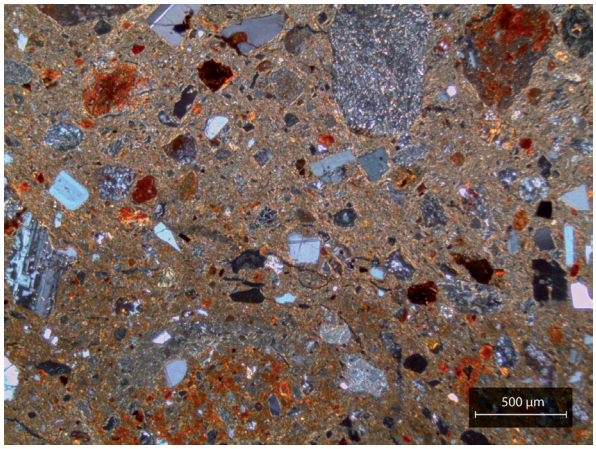

Figure 197: Sample RDO2.I2, featuring a matrix that was possibly sieved.

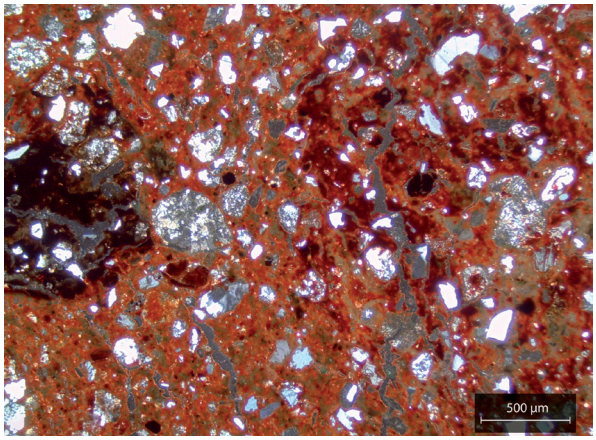

Figure 198: Example of a typical fabric for petrographic Group 1. Sample RDO1.X4 was photographed in XP (credit: Simone Casale).

1000 µm). Volcanic rock inclusions were present in lower frequencies and consisted of subrounded and rounded extrusive intermediate igneous rocks, connected with andesite (**figure 198**). One of the main characteristics of this group is the presence of volcanic ash with a distribution spread throughout the matrix (100-2000 µm). Accessory minerals were present but not common (Casale *et al.* 2019). Even though this group is only comprised of two samples, which vary in texture, they were still clustered together because they are connected with groups such as JOR2.B and UBI1.A, which are possibly linked to Honduras. Even though clay preparation practices are obscure, the

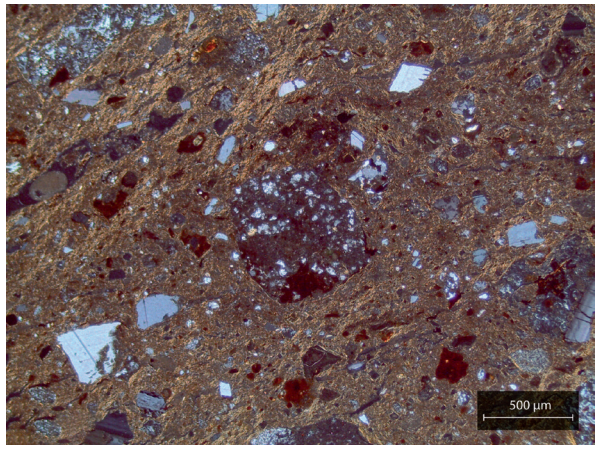

Figure 199: Example of a typical fabric for petrographic Group 2. Sample RDO1.E3 was photographed in XP (credit: Simone Casale).

contrast between the angularity of quartz and feldspars with the more rounded shapes present in volcanic rock inclusions could be interpreted as evidence of temper or exploitation of a clay outcrop with an eroded substrate mixed with more contemporaneous transport episodes. Voids were of meso-elongated shapes; meso-vughs were also present (150-500 µm) and did not show orientation to the walls. Firing temperature was estimated between 650 and 750 °C.

The majority of the samples analyzed (n=8) were classified within **Group 2** and its subgroup, which share mineralogical characteristics but differ in the characteristics of their matrices. In particular, this subgroup is characterized by the presence of coarse inclusions spread throughout a fine matrix, while the main cluster features variable inclusion sizes (300-1000 µm) without a finer substrate (**figure 199**). Also, one of the samples within the subgroup, RDO1.I4, contained basalt, in contrast to the rest of the samples within the main group and subgroup, which were more connected with andesite. Both groupings mainly featured angular to subrounded quartz (50-550 µm) and angular to subangular plagioclase feldspars (200-600 µm), combined with fragments of extrusive intermediate igneous rocks (200-1000 µm), as well as subrounded to irregular iron-rich inclusions (100-300 µm) and volcanic ash (100-500 µm). It is important to mention their similarities with one of the identified petrographic groups at Barillas, which is linked to the Güegüestepe ethnographic sample (see 7.8). Voids were of meso-elongated shapes; meso-vughs were rare (100-250 µm) and did

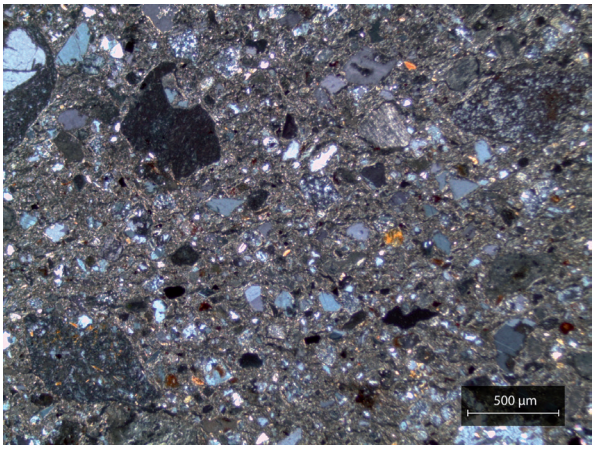

Figure 200: Example of a typical fabric for petrographic Group 3. Sample RDO1.E1 was photographed in XP.

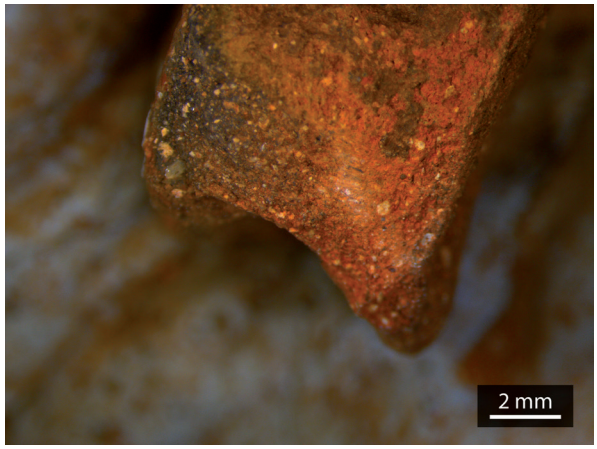

Figure 201: Sample RDO1.X4, featuring a U-shaped coil junction.

sometimes show orientation to the walls, depending on the vessel part analyzed. Firing temperature was estimated between 650 and 750 °C.

Group 3 is defined by a high frequency of coarse extrusive intermediate volcanic rock inclusions connected to andesite (100-600 µm), angular to subrounded quartz (100-500 µm), angular and subangular plagioclase (100-500 µm), and olivine (100-400 µm) (**figure 200**). The only **outlier**, sample RDO2.E4, is characterized by the dominance of one single type of volcanic inclusion, globular quartz inclusions with iron-rich minerals (100-3000 µm), which could connect it to Group 3, but the absence of other volcanic inclusions is distinctive. Voids were of macro/meso-elongated shapes; meso/macroelongated vughs were also present (150-250 µm) and sometimes did show orientation to the walls. Firing temperature was estimated between 650 and 750 °C.

7.6.2 MACROTRACES OF MANUFACTURING PRACTICES

In general, the assemblage is characterized by an undulating cross-section, where coils are clearly visible, combined with an irregular topography, which—together with the shape of the sherds and the orientation of both inclusions and voids—point to preforming through assembled elements (coils). Apart from that, the RDO assemblage shows traits related to wet clay preforming, such as the combination of abundant protuberant and floating grains combined with visible threaded striations possibly connected to smoothing on wet clay with dry fingers, found on both internal and external walls of the fragments analyzed. However, leather hard clay smoothing was also common and is evinced by surfaces with inserted grains and a compact topography that very usually obscures previous steps of the manufacturing sequence. Coating vessels with slips was a common practice, and some of them were also burnished afterwards.

The 15 samples submitted for petrographic characterization were examined for macrotrace identification of manufacturing practices. All samples featured fashioning through assembled elements (coils, see **figure 201**), which generally measured between 1.0 and 1.6 cm wide in 86.0% of the cases (both restricted and unrestricted shapes, wall width usually between 4.0 and 9.0 mm, with one exception of 12.0 mm). Only one sample, corresponding to an unrestricted vessel, featured small coils (0.7 cm) combined with thin walls (4.0-5.0 mm), while a single sherd, possibly part of a restricted vessel, yielded large coils (2.5 cm) with wide walls (up to 14.0 mm). Assembled elements were always possible to measure with no exceptions, showing a lack of intensity in roughing-out gestures.

Preforming of vessels was carried out through pinching and drawing, and all samples featured traces related to wet clay finishing (protuberant grains in combination with threaded striations, **figures 202** and **203**), which are interpreted as finishing and smoothing on wet clay with dry fingers. Tool marks were identified in a few cases and were

Figure 202: Sample RDO2.B4, featuring prominent grains characteristic of wet clay finishing.

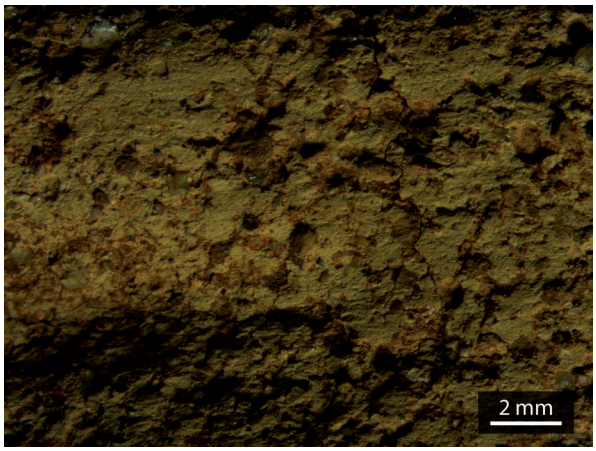

Figure 203: Sample RDO1.G4, featuring a combination of prominent grains with threaded striations, characteristic of wet clay finishing.

usually found on the internal walls of the vessels—but not exclusively. This suggests the use of a tool and possible support with the other hand holding the external surface of the vessel wall, followed by the repetition of the gesture inverting the position. The RDO sample, unlike other sites, did not pose doubts regarding the possibility of leather hard clay finishing; evidence supporting a wet clay hygronomic state was very solid. However, smoothing both on wet and leather hard clay (**figure 204**) was present (exclusively on samples within petrographic Group 3). Surface treatment occasionally involved coating with a reddish-brown slip and occasional burnishing.

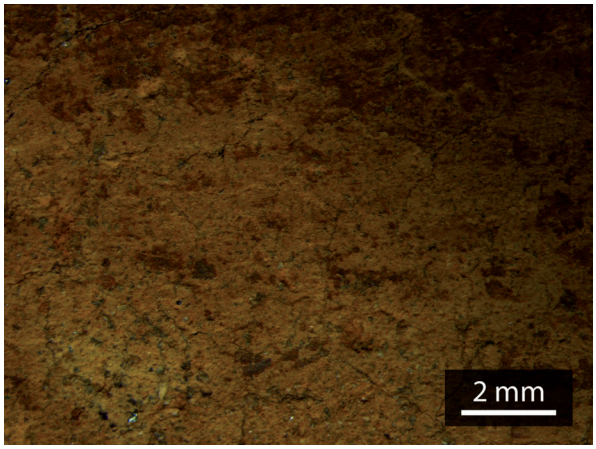

Figure 204: Sample RDO1.E1, featuring inserted grains and compact microtopography, characteristic of leather hard clay smoothing.

Fragmentation of the analyzed sample and absence of full vessels complicated a full macrotrace analysis. However, vessels were possibly constructed separating the different sections (base, body, neck/rim), all involving the coiling technique and gestures connected with wet clay roughing out and preforming, sometimes but not often followed by leather hard clay surface treatment and firing in oxidized atmospheres without much control.

7.6.3 MORPHOMETRIC ANALYSIS

Since only ten recovered rim fragments were large enough to draw and make morphological inferences, it is impossible to attempt any quantitative analysis regarding vessel shapes at RDO (**figure 205**).
However, some insights can be drawn; for example, *olla* rims with diameters between 10 and 25 cm and wall thicknesses between 6.0 and 12.0 mm were identified. Two of these samples were classified as "Carca" style rims (**figure 206**). *Olla* rims were exclusively recovered from excavation unit RDO1. Also, outflaring straight walled jars (CRD) of diameters between 23 and 30 cm, with wall thicknesses between 6.0 and 9.0 mm, were retrieved from both excavated contexts. One curved jar (CC), from excavation unit RDO2, measured 25 cm in diameter and 9.0 mm in wall thickness. Even though the largest diameter measured within the sample was 30.0 cm—corresponding to a CRD—the detailed analysis of vessel bodies points to the presence of large vessels as well.

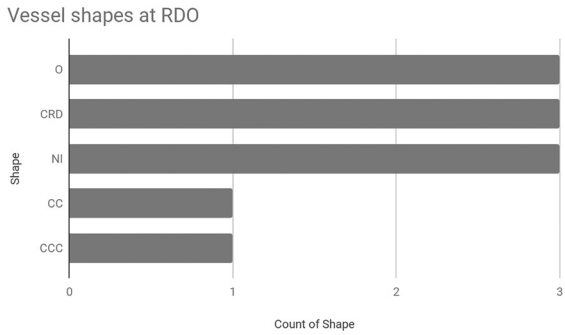

Figure 205: Vessel shapes at RDO.

Figure 206: Sample RDO2.K4, a Carca style rim sherd.

Figure 207: Sample RDO1.I4, featuring incisions of bands of subparallel lines oblique to each other, done in leather hard clay.

7.6.4 DECORATING TECHNIQUES

Sherds with slipped surfaces—either internal, external, or both—comprised 33.0% of the total sample analyzed, while other decoration practices were present in 21.0% of the sherds and consisted mostly of incisions, followed by appendages, appliqué, and impressions.

The most ubiquitous decoration technique was incising, and it was divided into two different types. The first group represents the main trend within the assemblage, which consisted of bands of subparallel lines (<1.0 mm) positioned oblique to each other at irregular intervals. These incisions were done on leather hard clay and always on the external surface of vessels (**figure 207**). Within this type, two samples featured thinner lines of less than 0.5 mm.

The second cluster includes incisions done on wet clay and is divided in two categories. The first one features two samples with incisions on their external surfaces: one with three perfectly parallel lines (1.0 mm) spaced at regular 4.0 mm intervals and with subparallel lines (<1.5 mm). The second subgroup only includes one sample, incised on the internal surface with wide (>2.0 mm) lines, which suggest the possibility of a *molcajete* shaped vessel. However, the sample is too fragmentary to make any further assessments.

Appendages mainly featured conical supports with variable measurements (12.0-14.0 mm diameter at the part attached to the vessel base, 4.0 mm diameter on their tip, 17.0-18.0 mm height), as well as a "button" support with 14.0-18.0 mm diameter and 8.0 mm height. Moreover, only one sample featured appliqué decoration exclusively, which comprised an oval shape measuring 10.0 by 7.0 mm, positioned right below the vessel's lip (**figure 208**).

Two samples yielded combined decorative techniques on their external surfaces. One sample was incised with two bands of parallel lines (<1.0 mm), one placed parallel to the rim and the other oblique to it, creating a geometric pattern and, right above the incised area, a coil measuring 7.0 mm wide was applied with an orientation parallel to the vessel mouth, and then impressions were made with a tool tip approximately 2.0 mm wide. Another sample featured a coil 10.0 mm wide that was applied parallel to the vessel mouth and

Figure 208: Sample RDO2.5, featuring an oval appliqué decoration.

punctuated (Ø 4.5 mm); then below and perpendicular as well as parallel to this, thin subparallel lines (<1.0 mm) were incised to form a geometric pattern. Finally, impressions were present in three samples—all Carca style rims—with variable measurements (2.0-5.0 mm wide, see **figure 206**).

7.6.5 CERAMIC MANUFACTURING SEQUENCES AT RDO

The sample analyzed at RDO yielded homogenous results through macrofabric, petrographic, macrotrace analysis, vessel shape, and decorating techniques, so differences in the steps of the operational sequence are minimal. In spite of this, three different production sequences were identified.

Operational sequence RDO-I

This category corresponds with petrographic Group 1, characterized by volcanic ash inclusions and connections with other samples identified as exogenous. Even though clay preparation practices could not be confirmed, the mineralogical characteristics of the samples suggest either differential clay procurement practices or tempering during paste preparation. Regarding fashioning, coils between 1.3 and 1.8 cm were positioned in an oblique manner, from inside to outside. Lip coils were positioned from the outside, with a U-shaped cross-section juncture for one sample (see **figure 201**). Preforming involved pinching and drawing, and finishing was undertaken on wet clay (prominent grains); the specific technique applied, as well as surface treatment, could not be assessed due to fragmentation and erosion. Decoration was present on one fragment and was done with impressions in the Carca style. The samples were fired in an incompletely oxidized atmosphere at temperatures around 750 °C. The end products associated with this sequence consisted of a CRD (Ø 25.0 cm, 4.0 mm wall width) and a possible *olla* (Ø 10.0 cm, wall width 9.0 mm), which featured the Carca style decoration. This sequence was found in both excavation units, in connection to a hearth related to mound construction (excavation unit RDO1) and within the core cultural layer of RDO2.

Operational sequence RDO-II

This category corresponds with petrographic Group 2 and its subgroup, which is considered the main sequence related to local clay procurement practices. Mineralogically, the paste is characterized by volcanic rock inclusions generally connected to andesite, mainly in combination with plagioclase feldspars and quartz. Following the similarities with the Güegüestepe ethnographic sample, it seems that paste preparation was absent. An exception to this is the subgroup within this cluster, which appears to have been sieved. Fashioning involved the assembling of coils between 1.0 and 1.4 cm, with two exceptions: the only base in the sample analyzed was roughed-out with coils measuring 0.7 cm, while a large vessel featured 2.5 cm coils combined with the thickest wall found in the sample (11.0-14.0 mm).[82] Therefore, coil size had very specific ranges but was adaptable depending on vessel section and function. Assembled elements were positioned equidistantly and in an oblique manner, with gestures either from the inside to the outside or vice versa; the base analyzed was fashioned through spiral coiling. Finishing was undertaken on wet clay (prominent grains) with a technique that left no striations, while smoothing was evinced by threaded striations connected to dry finger gestures. Surface treatment involved a reddish-brown slip on one sample, as well as leather hard clay smoothing in only two samples. Decorating techniques involved impressions on the Carca style rim and appliqué; combined decorative techniques consisted of appliqué and incisions as well as incised zones with punctuated appliqué.

82 It is relevant to mention that the base from OP1 also yielded smaller coils than the vessel body.

Samples were fired in an incompletely oxidized atmosphere at temperatures below 750 °C. The end products associated with this sequence consisted of CC (Ø 25.0 cm), plates (Ø N/A), and *ollas* (Ø 25.0 cm). Wall thickness ranged from 4.5 mm to 14.0 mm, with restricted vessels being the thickest. Samples were retrieved from both excavation units; the RDO1 ones corresponded with mound filling and off-mound floor contexts, while the RDO2 ones were retrieved either from the core cultural layer or the one immediately underneath it.

Operational sequence RDO-III

The RDO-III sequence is associated to petrographic Group 3 and its subgroup, which are characterized by the predominance of coarse volcanic rock inclusions related to andesite, combined with more quartz and feldspars that tend to be more angular. Paste preparation practices might have involved some sieving, especially within the subgroup. Fashioning involved coils that measured between 1.1 and 2.6 cm, which were positioned equidistantly in an oblique manner with either inside to outside gestures or vice versa. In the only rim sample within the group, the lip coil was positioned from outside to inside and was of the same size as body coils. Preforming involved pinching and drawing, leaving clear wet clay evidence (prominent grains) as well as irregular threaded striations possibly connected to dry finger or dry tool smoothing. Sample RDO2.D4/RDO2I1.4(4) showed unique traces on its external wall, possibly connected to brushing with a straw or a corn cob. Surface treatment involved leather hard clay smoothing in all of the samples except for one, which yielded none. Additionally, one sample was coated with a reddish-brown slip on its external wall and then burnished, while another sample was burnished inside and featured fine subparallel incisions (<1.0 mm wide) performed on leather hard clay. Samples were fired in an incompletely oxidized atmosphere at temperatures more or less 750 °C. Due to fragmentation issues, defined end products were scarce, with only a confirmed CRD (Ø 30.0 cm); the other samples are both restricted and unrestricted, and wall thickness ranged between 4.0 and 9.5 mm. Contextually, samples were excavated from both excavation units, corresponding with the core cultural layer and the stratigraphic unit below it in unit RDO2, as well as with the mound's foundation in unit RDO1.

The only outlier within the sample analyzed (RDO2. E4/RDO2I1) yielded significant mineralogical differences, which could entail differential clay procurement and preparation practices, but the rest of the steps in the manufacturing process are consistent with the sequences described above. Differences, therefore, should be interpreted in relationship to clay procurement and preparation practices.

7.7 LA AVENTURA

The three excavation units placed at the site yielded 2020 ceramic fragments (12598.7 grams). In general, fragments were small, with an average length of 26.0 mm; 65.0% of the sherds were smaller than the average, while 35.0% were larger. Wall thickness can be divided in two different groups. The majority of the sherds (85.0%) featured vessel walls that averaged 6.0-8.0 mm in thickness, while a minor group (15.0%) yielded thicker walls, usually measuring between 10.0 and 14.0 mm. No vessel walls thinner than 5.0 mm were found in the sample, and none were chicker than 14.0 mm. Moreover, 77.0% corresponded to unrestricted vessels, 9.0% to restricted vessels, and the remaining 12.0% to undetermined shapes (see **Appendix 6**). The assemblage features several vessel parts, such as rims, rim/necks, shoulders, necks, bodies, bases, and handles. Decoration techniques included incisions, slips (white, red), and glaze. No incisions were found. One particular characteristic of this collection consisted of a reinforcement applied on the vessel's rim/neck (**figures 209** and **210**).

Fragmentation was medium, and sherds featured subangular edges, two characteristics that, when combined, could indicate trampling and erosion. Fragments were of quadrangular, trapezoidal, and triangular forms, which are typical for assembled elements fashioning, in particular the coiling technique. Sherds featured good conservation and metallic sounds. Surface colors tended towards brown tones, with minimal occurrence of lighter colors such as orange and yellowish brown. An abundance of fire marks associated with production and variability of cross-section colors suggest firing in contact with flames or smoke and different positioning of the vessel in relation to fuel source. Therefore, firing probably took place on an open hearth without much control. A total of sherds 592 (8917.3 grams) were sampled from excavation units for further analysis.

Figure 209: External surface of sample LA1. E4, featuring a reinforcement on the short neck with digital impressions.

Figure 210: Internal surface of sample LA1. E4, featuring a reinforcement visible next to the preferential fracture of the vessel neck.

7.7.1 PASTE ANALYSIS

Macrofabric groups

In total, only five different macrofabric groups were identified in the sample analyzed, as well as few outliers (**Appendix 14**). The assemblage was highly homogeneous, with 76.0% of the samples classified within one single macrofabric group (LA1.A), and the remaining four groups were similar in composition—

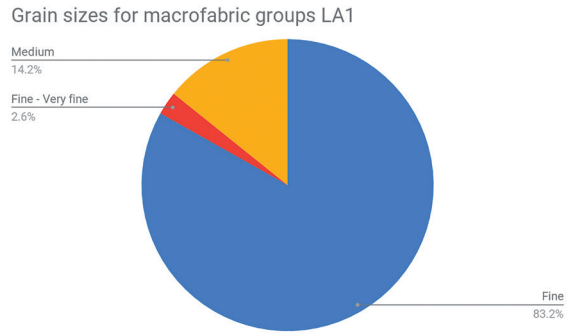

Figure 211: Grain sizes for macrofabric groups LA1.

the main inclusions were feldspars, rock fragments and quartz—and differences were only found in texture and frequency, suggesting the use of a single clay source for most of the sherds. Outliers featured white paint and glazing. Also, construction materials such as roof and floor tiles were observed.

Groups featuring fine grains comprised 83.2% of the sample, while those containing medium grains were 14.2%, and those featuring a combination of fine and very fine inclusions were 2.6% (**figure 211**). No coarse groups were identified within the sample analyzed. Frequency of inclusions was low in comparison to other sites, with the vast majority of the sherds featuring frequencies of inclusions between 5.0 and 10.0%, while the rest ranged between 10.0 and 15.0%. Therefore, either clay procurement involved a preference for naturally finer clays, or sieving and sorting practices were more common than tempering practices. Apart from that, inclusions tended towards a combination between low and high sphericity, with one group as an exception (LA1.E), which yielded high sphericity only. The dominant orientation of the inclusions was subparallel and oblique to the walls of the vessels, but also chaotic and sometimes concentric. Voids were generally of plate-like and irregular shapes, and their orientation was mainly subparallel, chaotic and oblique. Several fragments featured undulating forms.

With regard to firing technology, variability in the core-margin relationship, as well as cross-section and surface Munsell colors, suggest different temperatures, duration of firing, and position of the vessel (or vessel part) regarding the fuel source, which would explain the variability ranging from complete oxidizing atmospheres (very few samples)

to different varieties of incomplete oxidation, as well as reductive atmospheres (in minimal examples). Smoke clouds are present on external surfaces, as well as smoking (both internal and external). Apart from that, carbonization from use-alteration, soot deposits on external walls, and encrustations of charred remains on internal vessel walls were observed. The sample at LA1 was characteristic for its abundance of fire marks related to production and also showed traces of carbonization related to use.

Petrographic Groups

The 15 samples examined through a polarizing light microscope were classified into one major group including a subgroup, as well as one outlier, whose main characteristics did not match any of the groups (Casale *et al.* 2019). Observations under the petrographic microscope matched the ones undertaken during macrofabric analysis; the pastes analyzed at excavation unit LA1 are extremely homogeneous in their intermediate volcanic composition, size, shape, and frequency of inclusions, as well as the composition and characteristics of the matrix. In particular, the clays examined show extreme similarities with the Güegüestepe ethnographic sample (see 7.8), which was manufactured with clays procured a few hundred meters off the archaeological site.

The main cluster, **Group 1** (**figure 212**), is characterized by a non-calcareous iron-rich matrix featuring medium to coarse clay pellets and intermediate volcanic rock inclusions connected to granite and andesite (200-600 µm), with some isolated inclusions (between 1000 and 2000 µm) with rare basalt (200 - 1200 µm), as well as volcanic ash (200-600 µm). Igneous inclusions also include highly weathered volcanic rock fragments. Generally, three types of volcanic inclusions are present: lamellar plagioclase with orthopyroxenes and olivine (basalt), globular quartz inclusions with iron-rich minerals, and microphenocrists of plagioclase. The inclusions include sericite and micritic calcite, which could indicate hydrothermal alteration. The shapes of the inclusions range from subangular to subrounded, suggesting that they are a product of weathering processes rather than an intentional addition to the fabric. Subrounded as well as angular plagioclase and quartz are frequent as isolated minerals (100-500 µm), while olivine (100-400 µm) and orthopyroxene (200-300 µm) are mostly present both within the volcanic inclusions and in isolated positions. Also,

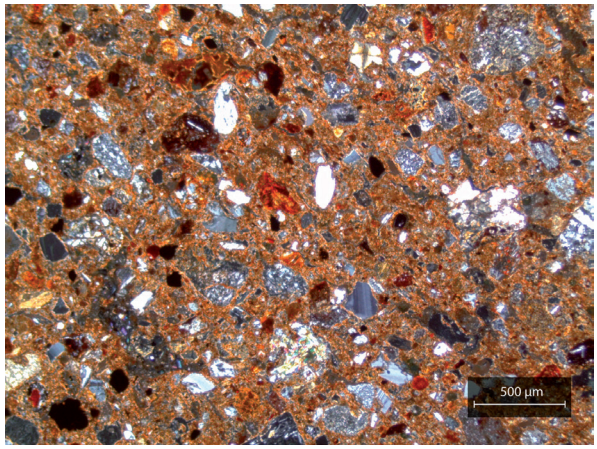

Figure 212: Example of a typical fabric for petrographic Group 1. Sample LA1.A4(8) was photographed in XP.

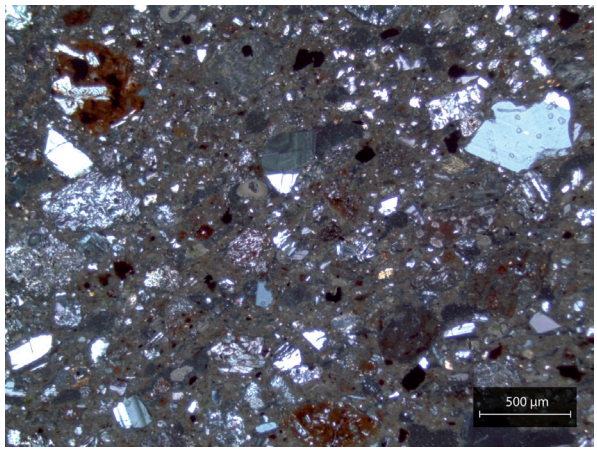

Figure 213: Example of a typical fabric for petrographic subgroup Group 1, featuring quartz and feldspar tempering. Sample LA1.B4 was photographed in XP.

clay pellets are common. As the matrix is optically active, firing temperature was estimated below 750 °C.

The subgroup within this cluster (**figure 213**), represented by the samples classified on macrofabric group LA1.B, yielded strong similarities with petrographic Group 1 at UBI, characterized by quartz and feldspar tempering. However, the presence of quartz at LA1.B is lower than at UBI1. The outlier LA1.D4.1 featured a high percentage of quartz and feldspar inclusions (both sanidine and plagioclase), in combination with volcanic rock fragments that

are more related to andesite than basalt. Accessory minerals included few orthopyroxenes and clinopyroxenes, as well as biotite; while iron-rich dark inclusions (100-400 µm) were frequent.

7.7.2 MACROTRACES OF MANUFACTURING PRACTICES

A general overview of the assemblage suggested preforming through assembled elements based on several lines of evidence. First, the shape of the fragments and orientation of inclusions and voids supports coiling as the main fashioning technique, as stated in sections above. Second, the topography of the sherds is mostly irregular. However, the presence of fabric imprints in some samples (less than 20 in the whole assemblage) suggests that roughing-out was also conducted with the aid of a passive support covered by a piece of cloth where coils were placed and worked (**figures 214** and **215**). It is unclear whether all fragments were fashioned in that manner, since heavy leather hard clay gestures, both for finishing and surface treatment, possibly obliterated fashioning traces. Therefore, pinching and drawing might have been applied for vessels preformed without a mold, while discontinuous pressure (palmar beating) might have been used in combination with the support. However, cross-section of fragments with fabric imprint do not feature the orientation of inclusions and voids parallel to the vessel walls, so this interpretation is problematic. The presence of fabric imprints is a strong line of evidence for molding, so this hypothesis is considered as a possible alternative operational sequence, maybe linked to specific end products.

Even though wet clay finishing is present, as is evinced by surfaces with protuberant grains, the majority of the samples seem to have been finished on leather hard clay with a variety of hydrated tools or fingers. Surface treatment also involved leather hard clay techniques, but with dry hard tools that left shiny surfaces and tool marks. The intensity of the surface treatment is evinced by compact surfaces, stress marks, inserted grains, and regular microtopography and is a distinctive characteristic of the LA1 assemblage (**figure 216**).

The 15 samples submitted to petrographic characterization were also thoroughly examined for macrotrace identification of manufacturing practices. All samples featured fashioning through assembled elements (coils), which measured between 0.8 and 2.0 cm wide. Sizes of coils varied within this

Figure 214: Fabric imprint on the internal wall of a sherd from LA1 (credit: Sebastien Manem).

Figure 215: Fabric imprint on the internal wall of sample LA1.4, also featuring clear sections with leather hard clay surface finish (credit: Sébastien Manem).

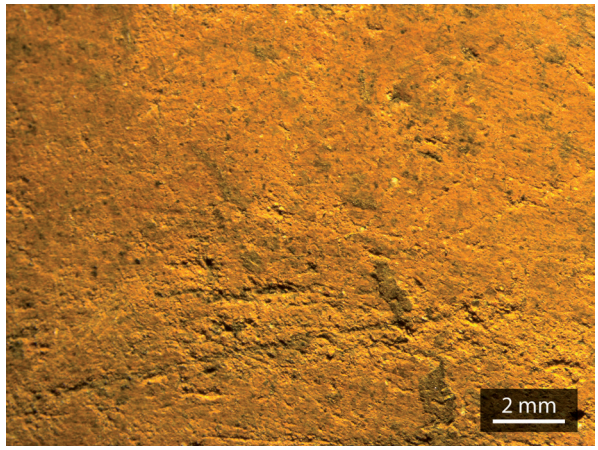

Figure 216: Sample LA1.A4(4), featuring compact microtopography and inserted grains, characteristic of leather hard clay work.

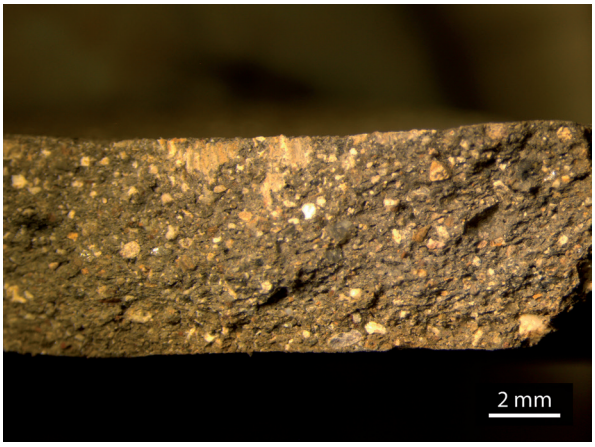

Figure 217: Cross-section of sample LA1.31, featuring an oblique coil juncture.

range, in both restricted and unrestricted shapes, with walls between 5.0 and 14.0 mm wide and with no apparent connection between coil size and wall width. For example, the samples fashioned with the thickest coils (LA1.B4/LA1.31 and LA1.A4(1)/ LA1.31.2) featured thin walls (5.5 - 7.5 mm). Apart from that, assembled elements (with one exception) were always able to be measured, suggesting less intensity in roughing-out gestures than at other sites, where they are very complex to identify. Coils were positioned in an oblique fashion (**figure 217**) and possibly equidistantly, either with alternate or oblique gestures, from the outside to the inside of the vessel or vice versa.

Apart from that, lip coils were positioned either from the outside or inside and were generally the same size as body coils but occasionally smaller. Preforming was mostly carried out through pinching and drawing, but, as mentioned above, some percussion also took place. The most predominant finishing involved leather hard clay smoothing with a rehydrated tool (possibly corn cob, straw, ceramic tool, or fingers), evinced by ribbed striations combined with inserted grains. Some samples (n=4) featured wet clay finishing, demonstrated by the presence of protuberant grains, but the absence of striations makes interpretation of the technique difficult. Striations were common but mostly connected to surface treatment, which consisted of leather hard clay smoothing and burnishing, either isolated or combined. Coating was almost entirely absent, with minimal representation within the sample analyzed, and mostly featured red and black, but also brown colors, which were always burnished.

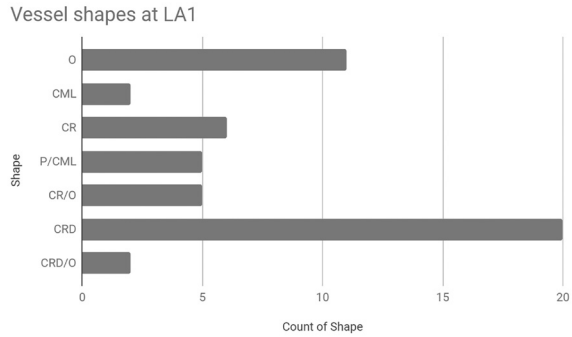

Figure 218: Vessel shapes at LA1.

The fragmentation of the sample analyzed, combined with an absence of bases large enough to conduct full macrotrace analysis, did not allow for a full reconstruction of the operational sequences of whole vessels. However, two main processes were identified: one involving the use of a mold and one related to modelling gestures. Reinforcement coils, applied on necks and junctures between neck and shoulder on *ollas*, as well as on griddle/plate rims, are a technical marker for this manufacturing tradition.

7.7.3 MORPHOMETRIC ANALYSIS

Vessel shapes at La Aventura were varied (**figure 218**) but repeated within certain standards related to size and morphology. The largest group of forms, the unrestricted ones, was dominated by CRD, which measured between 5.0 and 30.0 cm in mouth diameter, with a wall thickness ranging from 5.0 to 11.5 mm. On average, diameter was 18.6 cm (45.0% <20.0 cm and 55.0% > 20.0 cm). Straight walled jars (CR) featured diameters between 15.0 and 25.0 cm, while wall thickness ranged between 6.0 and 13.0 mm. Shapes that could be either a *comal* (CML) or a plate (P) had diameters between 25.0 and 40.0 cm,[83] while their walls ranged between 7.5 and 9.0 mm in thickness. Two confirmed *comales* measured 40.0 and 45.0 cm in diameter, with walls 7.0-8.0 mm wide. Samples classified as CRD/O or CR/O could either be restricted or unrestricted vessels, with diameters ranging from 10.0 to 25.0 cm and wall thicknesses between 6.5 and 12.0 mm. Restricted vessels consisted exclusively of *ollas*, with diameters between 5.0 and 30.0 cm and walls between 6.5 and

83 Different traditions of food presentation could imply the use of large communal serving plates (Vroom 2000; Roddick & Hastorf 2010).

12.0 mm. The diameter of *ollas* averaged 14.5 cm (45.0% <15.0 cm and 55.0% >15.0 cm).

In summary, and coinciding with the preliminary assemblage assessment, unrestricted vessel shapes dominated kitchenware at LA1; outflaring straight walled jars, straight walled jars, and plates (either cooking or serving) were ubiquitous and featured different sizes, both for individual and communal portions. Restricted vessel shapes were limited to *ollas*, with various—yet repeated—sizes.

7.7.4 DECORATING TECHNIQUES

Fragments with slipped surfaces—either internal, external, or both—consisted of 2.0% (red, black, and brown), while other decoration practices were present in only 6.0% of the sample and consisted almost exclusively (88.0%) of impressions done with the fingers on the external surface of *ollas*, most often right below the vessel lip, but sometimes also at the base of the neck, on the juncture with the vessel body. These impressions were either applied directly on the vessel neck or on a reinforcement coil or set of coils added to the vessel (see **figures 209** and **210**). Reinforcement coils were also present on unrestricted vessels, and in the case of *comales,* they could consist of folded lips (**figure 219**). The digital impressions combined with reinforcement coil(s) could be interpreted as part of pinching gestures; however, the horizontality of the impressions, together with their exclusive presence on certain parts of the vessel, suggests a combination of decorative and probably functional intentions (i.e. grip). This is supported by the fact that even samples without reinforcement coils present this trace, meaning that pinching gestures on those sections of the vessel were not necessarily connected in a direct manner to the assemblage of elements (coils). It is important to mention that this decorative feature is somewhat reminiscent of the Carca style rims.

Other decorations consisted of a glazed white sherd, a painted fragment—also white, but not glazed (see **figure 220**)—and a rim featuring black slip only on its lip. The only appendage found in the assemblage consisted of a cylindrical handle fashioned with a 1.5 cm coil.

Figure 219: Example of a griddle featuring digital pressure gestures on reinforcement coils (sample LA1.31.2).

Figure 220: Sample LA1.X1, featuring paint decoration.

7.7.5 CERAMIC MANUFACTURING SEQUENCES AT LA

The sample analyzed at LA yielded a unique combination of highly homogenous clay procurement and preparation practices, with one sole raw material outcrop exploited and use of its clay without modifications—even for construction materials, such as roof tiles. Minimal exceptions might involve sieving (LA1A4.4) or tempering (LA1.D4(1) and especially LA1.B4). Then, roughing-out was always conducted on assembled elements (coils) but featured high variability in the gestures and tools involved; on the one hand, pinching and drawing was identified for the bulk of the sample, but percussion and the use of a passive support was also observed. Finishing was predominantly on leather hard clay with a rehydrated tool, but wet clay techniques were also present. Surface treatment was also homogeneous,

with minimal coating and widespread leather hard clay smoothing and burnishing traces. Firing was done in an open hearth that reached temperatures below <750 °C, with mostly partially oxidized atmospheres and a few oxidized and reduced samples. These minimal differences were interpreted as divergent positions of vessels in relationship to fuel and flames rather than technical differences. As a result, one primary operational sequence was identified, with various subsequences related to paste preparation, roughing-out, and finishing.

Operational sequence LA-I

This sequence entails petrographic Group 1, a clay very similar to the Güegüestepe ethnographic sample, which is characterized by a high frequency of medium to coarse clay pellets and intermediate volcanic rock inclusions—connected to granite and andesite, volcanic ash, and rare basalt—as well as plagioclase feldspars and quartz inclusions. The end products of this sequence consist of both restricted (O, Ø 10.0-30.0 cm, 11.0-14.0 mm wall width) and unrestricted vessels (CML, CR, 20.0 cm Ø, 5.0-13.0 mm wall thickness). Addition or subtraction of materials during paste preparation seems absent (except for sample LA1.A4(4), see below), so the next step in the operational sequence, involving the placement of coils (0.8-1.5 cm), was done equidistantly with gestures both from outside to inside and vice versa, as well as alternate (identified on *comales* and possibly related to spiral coiling). Lip coil was positioned from the outside, the inside, or parallel to the vessel wall, and was usually the same size as the body, although two samples featured a smaller lip coil. Roughing-out subdivides this sequence in two subsequences: LA-IA and LA-IB. LA-IA is characterized by preforming through pinching and drawing, while LA-IB involved percussion and the use of a passive support dividing the clay from the mold with a fragment of fabric. LA-IA is subdivided in two regardless of vessel shape, with LA-IAa featuring wet clay finishing and LA-IAB leather hard clay finishing with the use of a hydrated tool, as well as the only decorative technique present on the sample analyzed: digital pressure either below the rim or at the juncture between neck and body, applied directly on the vessel wall or as a reinforcement appliqué. In both cases, surface treatment consisted of leather hard clay burnishing, with a single exception featuring leather hard clay smoothing (LA1.A4(1)/LA1.31.2).

Sample LA1.A4(4) could be classified as sequence LA-IC, featuring possible sieving connected to paste preparation practices, followed by coiling (1.3 cm) in an alternate manner, pinching and drawing, leather hard clay finishing and burnishing. The rest of the samples within this subsequence coincide with the petrographic subgroup that belonged to macrofabric group B and are characterized by possible tempering paste preparation practices. Roughing-out involved coils (0.8-2.0 cm) positioned either obliquely (from outside to inside) or in a parallel manner (LA1.B4/LA1.31.5), followed by wet clay finishing. Surface treatment consisted of leather hard clay smoothing and burnishing. Sample LA1.B4/LA1.31.5 featured decoration of digital impressions on a reinforcement below the lip. End products within this subsequence consisted of restricted and unrestricted vessels. Finally, outlier LA1.D4(1)/LA1II3, classified as sequence LA-ID, was possibly tempered with quartz, involved coiling (1.7 cm) in an oblique fashion (inside to outside), pinching and drawing, as well as leather hard clay burnishing, but the sample was too fragmentary to assess the finishing technique.

As mentioned above, coating was minimal, but was possibly present in all subsequences. Glazed and painted fragments were classified as outliers during the macrofabric assessment, so they were not sampled for petrography and were too fragmentary to examine macrotraces of manufacturing practices. Also, firing techniques were homogenous in all subsequences, and all samples, regardless of their sequence classification, were fired in a partially oxidizing atmosphere at temperatures below 750 °C. Finally, consumption practices were also homogenous, with extensive exposure of cooking vessels to fire, evinced by soot deposits on external surfaces as well as encrustations of charred materials on the internal walls. Ubiquity of *comales* and the possible use of corn cobs for fashioning might be related to transformations on foodways when compared to the pre-Hispanic culinary traditions.

7.8 CONTEMPORARY CERAMIC MANUFACTURING PRACTICES

Even though a systematic ethnographic study of traditional potters within the research area was not conducted due to time restrictions, meeting Doña Antonia Villegas Ruíz, an elderly woman who resides

Figure 221: A member of Espora Producciones filming firing techniques at the Güegüestepe community of potters (credit: Espora Producciones).

in the San Isidro community, inspired an opportunistic survey of local potters who still manufacture their ceramics using traditional techniques. In particular, the visit to Doña Antonia for the first time in February 2015 allowed me to start exploring certain aspects of clay procurement practices, as well as the properties of local raw materials (from clays to fuel), climatic conditions that affect pottery manufacture, and firing technologies.

This ethnographic study departs from a view that neglects the historicity of the communities under examination (Fabian 2014), or other Western-biased views regarding ethnoarchaeological endeavours (Gosselain 2016). On the contrary, this section intends to challenge the idea of a divide between communities before and after the arrival of Europeans in the region. Without denying the devastating effects in human populations, as well as the diverse histories of violence embodied in the invasion, colonial, and contemporary sociopolitical dynamics, the microhistories of ceramic manufacturing practices can actually serve as evidence of the palimpsestic ontology of present materialities.

In spite of this, time restrictions connected to the main goals of this manuscript did not allow intensive ethnographic campaigns. As a result, an ethnographic documentary film was jointly produced by Espora Producciones and PACEN (**figure 221**).

This audiovisual memory, titled "Barro Somos" (Espora Producciones 2016), recorded experiences in two different communities. The first is San Isidro, located immediately east of the Aguas Buenas archaeological site and home to Antonia Villegas Ruíz (**figure 222**), the last resident who remembers how to manufacture pots.

The second community is Güegüestepe (part of the San Diego community), which is a village located 400 meters north of a Mayales river meander northwest of Juigalpa, where families—as of 2015—were fully dedicated to pottery and brick production

Figure 222: Antonia Villegas Ruiz, the potter-healer who inspired the audiovisual documentation of contemporary ceramic manufacturing practices (credit: Espora Producciones).

(**figure 223**). There, we interviewed Angélica Bermúdez, Francisca Bermúdez Sequeira, Blanca Bermúdez Sequeira, and José Florencio Bermúdez, who produce vessels to sell to intermediaries, who, in turn, re-sell them at local markets throughout the region, but mainly in Juigalpa.

Therefore, this research involved both non-specialized and specialized potters. Additionally, a non-systematic interview was also undertaken at the Aguas Buenas II community, located north of Aguas Buenas, with María de la Cruz Pérez Silva. Casale (2017) included an ethnographic component in his clay procurement-oriented survey, so some of his results will also be included in this short section.

San Isidro

Clay procurement practices involved a raw material outcrop located 300 meters west of the potter's household, at the shore of La Garnacha stream. Clay was collected with a single blade posthole digger. Paste preparation did not entail the addition or extraction of materials other than water, as well as kneading and percussion gestures to obtain the desired plasticity. Fashioning was done with a clay mass, preformed in a "*tortilla*" shape, which was then placed over a convex mold with a piece of cloth for separation, preventing the wet clay from adhering to the surface of the mold. Percussion by palmar beating continued to be applied on the mold until the desired shape was achieved, and then immediately after—on wet clay—a corn cob was hydrated and applied with a double purpose: drawing and evening the surfaces. Then, the preform was dried for a few hours and then positioned on a concave support, after placing ash, followed by newspaper, between the vessel in the making and the plate acting as a support. Later, pinching using hydrated fingers to exert pressure and the palms as support, as well as palmar beating, were used to homogenize the walls. After drying for

Figure 223: Some members of the Bermúdez family, pottery and brick specialists (credit: Espora Producciones).

two (dry season) or five days (rainy season), surface treatment was executed with a *zapoyol* seed (from the Sapotaceae family). Finally, ash was placed in the pots before firing them in an open hearth. This hearth was on ground level, where a bed of fuel—wood, cut according to the sizes of the pots—was positioned; then the ceramics were added, and finally another layer of fuel covered them. When the fuel was consumed, the pots were left outdoors to cool down, while being handled with wooden Y-shaped forked stick. Vessels fired in this manner show fire marks derived from manufacture.

Doña Antonia's mother in law was a *locera*, a potter, and she learnt the craft from her through observation. However, Antonia never became a *locera* herself, and she hadn't produced a pot in more than 20 years by the time she was interviewed. However, she still remembered the procedure in detail. Also, it is important to mention that even though all meetings with Antonia were agreed upon in advance, she specifically dressed up with good clothes for firing, explaining that it is a decisive moment when pots can break. In summary, non-specialized potters produce their vessels within the household upon necessity; procure their clay, fuel, and water from nearby; and fire them either in their kitchen oven or on an open hearth. Tools and materials employed—apart from the raw materials—include a forked stick, a mold, a passive support, newspaper, corn cob (that is pre-prepared by rolling it on the floor with the feet), ash, and a piece of fabric.

Güegüestepe

Clay procurement practices involved exploitation of a clay outcrop located 400 meters south of the village, at the Mayales river. Clay was collected using a *machete,* and paste preparation practices only involved hydration, kneading, and pounding, without the addition or substraction of materials rather than water (**figure 224**).

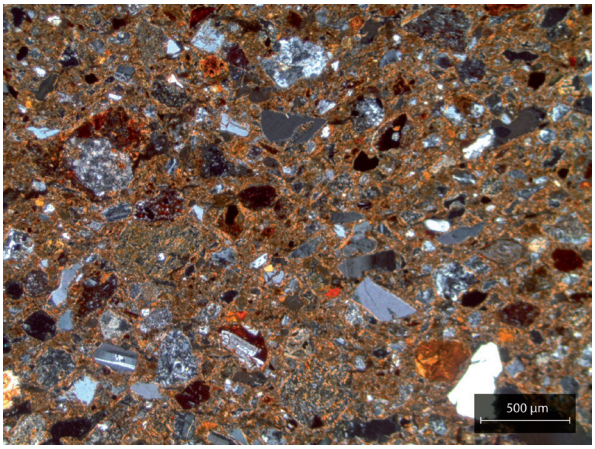

Figure 224: Thin section of a modern griddle, produced by the Güegüestepe community of potters. Sample was photographed in XP (credit: Simone Casale).

Fashioning was done with a clay mass, first preshaped as a *tortilla* and then applied to a mold with a piece of fabric in between. Percussion was performed through palmar beating, combined with drawing gestures that applied pressure with the fingers. In the case of *comales*, Doña Francisca used a concave mold that also served as a rotational support for finishing purposes, which were done on wet clay. For jars, Angélica placed the clay mass on top of a convex mold and then reinforced the upper part of the vessel by applying a large coil (5.0-10.0 cm) that is then crushed. Impressions caused by pinching were left on the upper parts of the vessel, reminiscent of the decoration identified from the archaeological samples excavated at LA. Finishing was also undertaken on wet clay, in this case with a hydrated corn cob and then with a thin but sturdy plastic tool (also rehydrated), manufactured from a shampoo bottle. According to the potters, the same tools and procedures are applied on different molds, depending on the desired end product. After drying—which can be outdoors or indoors—surface treatment involved burnishing with a *zapoyol* seed. Pots were fired in a kiln with one or two openings, until they were red; if a reddish tone was not achieved, more fuel was added until complete oxidation without fire marks was achieved. Finally, pots were removed with a Y-shaped forked stick and cooled down.

Specialized potters are either men or women; a gender preference was not a factor within the community of potters at Güegüestepe. Family relations are extremely important in the production process, and manufacture is completely separated from distribution, which is done by someone who does not belong to the family group.

Manufacture is organized at the family and household level, and it takes place at a house-workshop, which has designated areas for storing raw clay (generally kept dry), a table for fashioning, racks for drying, space for tools, finished vessels waiting to be fired, and fired vessels. Backyards always include kilns, constructed with a circular base of stones (very similar to pre-European mounds) and a semi-oval structure made of flexible tree trunks covered by a mix of tierra *lanilla* with *zacate*, occasionally reinforced with a bit of cement to avoid erosion by rain. For firing, Angélica also dressed up specially for the occasion, as Antonia did.

Other potters throughout the research area reported clay preparation practices, such as mixing of clays (Aguas Buenas II). In particular, Casale interviewed Guadalupe, a potter living just south of Güegüestepe by the Cuapa road, who also used to mix clays, and one of the outcrops she used represents the longest distance between a potter's household and a raw material source for the research area (Casale 2017, 60). In spite of this, the majority of the potters retrieved their clays near their households, and manufacturing practices are strongly connected to those identified at LA. The main difference is the disappearance of the coiling technique in favor of working on a clay mass, which was not identified at LA. Also, the generalization of percussion in relationship to molding resulted in the minimization of pinching and drawing gestures, which were directly connected to coiling. Finishing was always conducted on wet clay, which is not the case at LA, but surface treatment is very similar. Firing techniques are also different because modern samples are extremely fragile; *comales* can be broken with minimal hand pressure.

In the valley of Juigalpa, clays have been consistently transformed into ceramics for at least the last 1600 years. As discussed in Chapter 5, argillaceous materials have had many itineraries, which bundled with various types of materialities in differential temporal rhythms. In Chapter 7, ceramic technologies were discussed in depth, addressing both continuities and variability in the different steps of the manufacturing process. It is time now to integrate all this data into a chronological narrative that accounts for the unfolding of human experience within the research area.

8 From traces on sherds to the vitality of human experience

8.1 CHALLENGES OF COMPOSING VIBRANT CHRONOLOGIES

The main goal of traditional chronologies is not only the placement of events and processes according to the order in which they occurred, but also their arrangement in regular intervals of measured time. As discussed in Chapter 3, the philosophical and theoretical implications of this paradigm of time—and our relationship with it—are not implicit and should not be overlooked. Events and processes are not boxes waiting to be placed on a pile; they are interweaving threads that connect to themselves and each other in capricious yet non-random ways that cannot be severed from each other—in the sense of being both constricted and enabled by structure. In the traditional view, the piles of boxes are not only vertical but also horizontal; chronological charts organize what happened before or after certain dates, as well as what was co-occurring. Synchronicity and diachronicity are the first two dimensions of periodization. In the case of ceramic chronology, the boxes are filled with vessels, but only certain arbitrary traits are allowed in the boxes. Types and modes, generally based on shape, decoration, and perhaps paste recipe, are grouped in categories with an arbitrary range of variability regarding differences and similarities (but see critical assessments such as Malmer 1962 and Sørensen 2015). These categories, the types, which are often expressed graphically in drawings, connect the two axes in ceramic chronological charts.

The foundation of typological classification is its formal sensorial—mostly visual—pattern recognition. Instead of asking questions about why things change, what those changes mean, why and how archaeologists group things, and if we should keep doing it the way we were taught to, archaeology is more interested in establishing classification systems that remain unquestioned (Sørensen 2015). Unlike Sørensen, I advocate for the abandonment of typologies, which are grammatically part of this two-dimensional geometric time paradigm of synchronicity-diachronicity. Typologies should not be seen as "(...) of central importance on a very fundamental level since in practice [they are] (...) one of the main tools that we use to create both order and direction, i.e. time, within our data." (Sørensen 2015, 93). There are other ways to observe, feel, and think about the unfolding bundles of traces, about the *things* we work with.

The complexity of human experiences and changes in practices can be more chaotic and complex than we wished for; the desire and disciplinary effort to order them is entirely paradigmatic. An excellent example of the interplay between variables and the two dimensions of this discursive formation is the current debate regarding Bronze Age Europe. Ancient DNA studies (Allentoft *et al.* 2015) have challenged the association between Bell Beaker and Corded-Ware ceramics and human migration/population displacement. Previously, these ceramics styles were referred to as both a people and a culture (see Furholt 2014 as an example regarding this debate). Unfortunately, instead of using the new lines of evidence to question this paradigm, especially the assumption that things or other aspects of human experience are just elements that conform to "cultures", DNA data is sometimes used in replacement of pottery shapes. However, people do not equate with DNA, just as they do not equate with pots or even with language. This is precisely one of the many other dimensions that should be considered in chronological assessments, the one that archaeology tends to exclude: the *function* or *purpose* of change. How do vessel shapes (for example) change? What is the relationship between vessel form and culinary practice? What if there is a morphological change not paired with a technical

one? (Donner *et al.* 2019). We tend to relate the appearance of a new morphology as a possible synonym of arrival or innovation of ideas, people, foodways, and even social organization (Gorin 1990), but we fail at questioning why certain things are incorporated, how they are integrated into life, and how we can archaeologically differentiate between massive movements of people and histories of interconnectedness.

Time—in both its synchronic and diachronic abstractions—as well as pots and past human groups, are at the core of the chronological debate in the archaeology of Central America. This paradigm is translated into Cartesian charts, as outlined in Chapter 3. Since the chronological proposal in this book intends to paradigmatically differ from these views, the data collected was purposely not systematized into one of those charts. Instead of denying the constant becoming of materiality and its palimpsestic ontology, a narrative was created that hopes to illustrate the complexity and (dis) continuities of different intersecting and divergent itineraries. As a reader interested in the research area, this can be somewhat disorienting, because one might simply expect the "new" chart that will replace Gorin's. That is precisely what everyone—including the author of these lines—expected from this project at its beginning, when macrotraces of manufacturing practices were intended to be used as chrono-markers. In fact, the first research questions outlined—now forgotten in discarded versions of an introductory chapter—directly asked which steps of the operational sequence of pottery manufacture were more variable along a diachronic axis and could serve as chronological proxies. Such questions were formulated because they were articulated within the rules of a certain paradigm. After concluding the analysis of the data contained in the previous chapters, it was clear that such goals were unachievable. In the beginning, the method was blamed, thinking that maybe technological changes are not good markers for "social" transformations, but the problem actually resided in the way in which the questions were being asked; they were just looking for another isolated trait that could help build a chronology rather than rethinking what a chronology should be. The nuanced complexity of the past was misunderstood, maybe due to a limited view of the palimpsestic complexity of the present. Therefore, the building blocks of Chapters 4 and 6 (Fieldwork and Laboratory methods), and especially of Chapters 5 and 7 (Spatiotemporal dataset and Ceramic technologies) hopefully demonstrate a reflexive development that took this research to a different *episteme*, in Foucault's (2005) sense.

Visual representation of these chronological views was not the only challenge encountered. Since a chronology is conceptualized in these pages as a story of the different intersections between divergent and convergent, as well as continuous and discontinuous, interweaving and unfolding itineraries, it was also hard to structure a history of the becoming of ceramic technologies within the valley of Juigalpa using typical terminology and references. The chronological charts mentioned above are usually accompanied by summaries in which the pictures of ceramic vessels included in the chart are thoroughly explained, together with references to site configuration, settlement patterns, radiocarbon dates, data regarding mortuary practices, lithic technologies, and inter-regional connections. These syntheses vary in the types of datasets that they integrate—as outlined in Chapter 2, where the different accepted chronologies for ancient Nicaragua were explained—but they do tend towards a certain standardization. Even though this research departs from this type of discursive structure, the chronological narrative that will be presented in the next pages was separated into the intervals arbitrarily established by the radiocarbon dates obtained during excavations. The choice is metaphorical, and this is further elaborated in section 8.2 (see below).

Apart from not presenting the "new chronological chart for central Nicaragua", a typology will not be outlined, and the operational sequences presented in Chapter 7 can hardly be used as types are normally applied. This can be linked to a broader debate regarding the actual value of technological approaches to ceramics, since they do not seem to be capable of creating observable abstractions such as types, which have proven to be extremely useful in the daily practice of the archaeological discipline. Typically, straightforward typologies are easily learned and recognized by any archaeologist in a relatively short amount of time. In contrast, even though technical traits are not that difficult to identify after proper training, their interpretation requires a greater investment in training and broader knowledge, including geology, geomorphology, geochemistry, ethnographic observations, and even experimenting with clays. Integrating technological

analysis into chronology building and beyond is thus a challenge because of the ubiquity of the typological approach within archaeology, a discipline that teaches to observe, recognize, and work with types. However, if practitioners become truly aware of the implications of grouping certain formal patterns into clusters, as stated above, disregarding how those things were made and used, and in connection with which other things they were experienced, then it is not that hard to understand the necessity of a paradigmatic shift. The switch would imply a discursive journey from the typological paradigm to the processual approach of looking at the intersecting microhistories of ancient peoples.

The level of detail achieved through microtechnological studies can also questioned: why do we want to know so much about these people? What does this detailed knowledge actually tell us about the bigger picture? Can we still produce grand narratives and answer relevant questions from a microtechnical approach? Additional inquiry that leads to new knowledge should never be an issue when adopting or discarding certain types of study, especially if the epistemological foundations of what we are currently doing are limited. Also, the chrono-narrative presented in the next pages is based on a technological examination of ceramics and, when contrasted to past culture-historical narratives (Gorin 1990; Rigat 1992), evinces the advantages of both its theoretical and methodological approaches.

8.2 THE VITALITY OF THE VALLEY OF JUIGALPA (CAL 300 CE - PRESENT)

In photography, a time-lapse is a method that shows a sequence of individual pictures taken at set intervals, showing a slow process in a short time. Thinking from a *longue durée* perspective, a time-lapse would be a fitting metaphor for this research endeavour, in which the objective of the camera (time-space) goes through constant transformations at different time scales, velocities, and durations, which are captured at specific intervals. A fundamental difference between an archaeological and a photographic time-lapse is that in archaeology, these intervals are not premeditated and cannot be predicted with specific rhythmic, systematic, and arbitrary gaps, but rather are defined by the capriciousness and probability of absolute dates. Therefore, the chronological sequence in archaeology is comprised of different frames shown at various velocities and with dissimilar intervals and durations.

In this narrative, the camera is shooting the valley of Juigalpa, and the story starts around 300 cal CE, with a lot of emphasis and details between 400 and 1420 cal CE, and overlapping calibration issues between 1650 and 1950, probably related to the de Vries acute effect.[84] Even though the story is neverending from an individual lifetime perspective, because it still unfolds as the author writes these pages and as you read them, the text does not delve too much in what is commonly referred to as present, which would go beyond its goals. However, some insights into it will be provided, because in this story, the valley has, is, and will continue to vibrate and become with the flows of intersecting trajectories of different processes and practices, portrayed in various frequencies of depth (ceramic manufacture and consumption, lithic technologies, human-animal entanglements, site configurations, climate, etc.) and amplitude.

Ceramic manufacture within the valley is a continuous thread over the different time scales: the *l'histoire événementielle, l'histoire conjoncturelle,* and *la longue durée* (Braudel 1949). For example, a volcanic event transects the itineraries of medium-velocity social processes, such as community organization, which can cause one or a series of events (i.e. migration). However, if looked closely, the various tiny threads in a mass that seemed to be uniform become apparent. Therefore, the next pages will explore these finer threads, the steps of the *chaîne opératoire*, their historical unfolding, how stable and prone to change they have been, and the interconnections between them to other interrelated practices, such as foodways, organization of daily life, relationships with the landscape, etc. All of these itineraries will be integrated into narratives whose duration has been arbitrarily determined by radiocarbon dating. Therefore, what follows is a heterodoxical "chronology", one that will not provide a Cartesian chart, or the triade "*tipo, época y cultura*" that is so beloved in the archaeology of

84 Fluctuations in the concentration of athmospheric radiocarbon have naturally taken place between the 16th and 19th centuries, which challenge probabilistic interpretations (de Vries 1958; Lerman *et al.* 1970; Damon *et al.* 1978).

the Americas,[85] but a rich narrative of the unfolding universes of what has been possible in this valley.

8.2.1 GEOMETRIC WORLDS (CAL 300 - 900 CE)

Between cal 300 and 900 CE, the valley of Juigalpa went through several transformations. Human practices became deeply interwoven with the valley, involving procurement of raw materials for construction practices, the manufacture of stone and ceramic objects, agriculture, and other practices related to nourishment such as hunting, gathering, and rock carving. Humans shared their livelihoods with the local plants, animals, soils, hills, rains, winds, streams, and rivers. In the next pages, threads of these intersecting itineraries will be threshed in an attempt to better describe the first vibrant "photo" of the time-lapse, which includes two places: Alberto Obando (in particular, excavation unit AO1) and Aguas Buenas excavation units AB3, AB4, AB5, AB6, and M1.

As far as the research methods have demonstrated, sometime around cal CE 300, groups of humans that knew the valley well—or were familiar with similar settings—engaged in certain practices that left concrete and identifiable evidence of their doings observable for us today. It is not clear if this shift in human traces might be related to the effects in the study area caused by active volcanic activity in the Managua region between 1 and 300 CE, or to the Las Isletas flank collapse of the Mombacho volcano between 270 and 300 CE (Dennett 2016). Whatever happened before this moment is very speculative, but the start of construction projects such as Aguas Buenas and even much smaller scale endeavours like Alberto Obando denote a profound knowledge and shared perceptions about the valley. Both sites were built on the slopes of the sheltering Cordillera, next to seasonal streams and creeks, covered by the fertile and malleable *lanilla* soil, and at a cautious distance from both the floodplain located a few kilometers south and from the Mayales river to the west, which overflows during heavy rainy seasons, as evinced by its several meters of sedimental deposition on its shores, as well as its paleochannels. The Carca stream shores—situated to the east of both sites—were also subject to intense flooding episodes around this time, as suggested by the results of the stratigraphic analysis of later sites (i.e. Oporta). The spatial configuration of both sites is mainly circular or elliptical (Alberto Obando's general design and Aguas Buenas concentric arches), but with an angular logic as well, as evidenced by Aguas Buenas's quadrangular central flat space. The builders of these first architectural sites were also aware of the different materials around them; they were familiar with the plants, animals, rocks, clays, subsoils, bedrock, hills, streams. Their interactions unfolded in building technologies, as well as the manufacture of cooking, storage, serving, and cutting implements, as well as rock carving practices. Since material culture from the earliest practices at Aguas Buenas is scarce at excavation units AB3, AB4, AB5, and AB6, it is challenging to offer a comparative overview with Alberto Obando. However, the results of this research provide some insights into both sites. Ceramic technologies at AO1, AB3, AB4, AB5, AB6, and M1 display a homogenous set of manufacturing steps aimed at obtaining similar end products. To begin with, the ratio between unrestricted, restricted, and unidentified vessel shapes was coherent, with 75.0%-15.0%-15.0% for AO1, 77.0%-8.0%-15.0% for AB3, 85.0%-15.0%-0.0% for M1, 62.0%-11.0%-27.0% for AB4, and 43.0%-6.0%-51.0% for AB6. Differences between AB4 and AB6 and the rest of the excavated contexts could be explained by a statistical bias related to reduced sample size as well as fragmentation and erosion of samples, which made vessel shape identification challenging, and augmented the proportion of unidentified forms. In contrast, differences between AO1 and AB3 could be interpreted as contextual, suggesting a lower frequency of cooking and storage practices at a public space such as the *Empty Area* of AB (AB3). Seen in this light, it is not surprising that restricted vessel number is lower when compared to AO1. Higher proportions in the sample analyzed for M1 could in turn be related to sample bias, due to the fact that the sampling strategy was designed with different research goals (Kwast 2013). However,

85 In Mexican archaeology, it was believed until one decade ago that ceramic typologies were unequivocally congruent with both temporal and cultural affiliations. For example, at a pottery analysis seminar at Universidad Veracruzana in 2005, exams presented students with a set of sherds that they had to classify according to their type, phase, and culture, paradigmatically equating types not only with defined temporal intervals (which is possible when following a type-variety method, for example), but also with identity formation processes and even linguistic affiliations.

it might also be contextual, reflecting a higher intensity of cooking practices before and during the construction of the mound compared to after its erection. Maybe the sole act of building Aguas Buenas (A. Geurds, pers. comm. 2018), with its own duration and technological unfoldings that included material procurement and preparation, shaping of structures, finishing, and maybe also decorating, was enmeshed in most of the practices related to the site.

Some culinary practices of these communities can be inferred from an examination of vessel morphologies. For example, the end products of all excavated units consisted of mainly CRD (Ø 13.0-40.0 cm, 4.0-8.0 mm wall thickness) followed by CR (Ø 13.0-30.0 cm, 3.5-6.0 mm wall thickness), but also contained the presence of CCC (Ø 4.0-21.0 cm, 3.0-5.0 mm wall thickness), CCo (AO1: Ø 30.0-33.0 cm, 4.5-5.0 mm. AB6: Ø 5.0 cm, 6.0 mm wall thickness), CC, and CRC. Therefore, cooking wares at Alberto Obando and Aguas Buenas show a preference for thin walled unrestricted and partially restricted small (individual), medium (individual or small group), and large jars (larger amounts of people) for cooking, serving, and storing. Presence of plates (AO1: Ø 6.50-30.0 cm, 3.0 mm wall thickness; one Ø 40.0 cm and 5.0 mm thickness - AB6: 20.0-40.0 cm Ø, 4.0-5.0 mm wall thickness) might suggest serving and storing but could instead have been used as lids for the unrestricted vessels, in order to keep the contents undisturbed and help maintain temperature (either hot or room temperature) for cooking, storing, or serving. Absence of *ollas* at AO1, AB3, AB4, AB5, and AB6 is remarkable, especially when contrasted with their presence—although minimal—in M1. Constructors of M1 at Aguas Buenas apparently cooked and stored food and beverages in *ollas*, while dwellers of Alberto Obando and the people who left their ceramic traces at AB3, AB4, AB5, and AB6 apparently did not include this vessel shape in their kitchenware, at least in the excavated contexts.

The manufacturing processes involved procurement of local clays, often used without any visible modification, but with recurrent sieving, sorting, and tempering practices. Clays of very coarse to coarse grains were preferred for potting, but some medium grain ones were also employed (AO1 and AB3). Tempering within all excavation units consisted of grinded quartz and feldspar fragments, but M1 also featured grog in all of its petrographic groups except for one (Casale 2017, 95-96). Grog tempering is absent in the rest of the sample analyzed for this manuscript, except for one sherd at OP1, a later context. Geochemistry has established that these clays were local (Casale 2017), so a divergent microtechnical tradition at M1 should be considered. Fashioning involved coils between 0.5 and 2.5 cm, placed equidistantly with gestures from outside to inside, inside to outside, or alternate. Lip coils were either the same size of the rest of the vessel's coils or larger. Pressure was exerted through pinching and drawing bodily gestures, while finishing was usually undertaken on wet clay with a dry tool or fingers, leaving traces such as threaded striations combined with protuberant grains. Leather hard clay finishing (shaving) was also present but in minimal quantities. Surface treatment involved leather hard clay smoothing, coating with slips, and occasional burnishing. Firing was done in oxidizing atmospheres (M1 is the only context where reduction is also present), with temperatures below 750 °C.

Decoration practices were also homogeneous not only in regards to technique but also aesthetic preferences. Fragments featuring slips comprised 75.0-80.0% of the sample analyzed for both AO and AB excavation units, but the ubiquity of other decorative techniques was differential depending on the context. At AO1, for example, only 5.0% of the assemblage was decorated with other techniques, while AB3 featured 21.0%, an increase that is interpreted as a result of the contextual differences between the two excavation units—AB3 is from a large public area, while AO1 is associated with a low platform mound. These techniques involved double slips, with a preference—in decreasing occurrence—for red on white and red on orange within both AO1 and AB3, as well as orange on white and brown on red in AB3, and brown/orange, black/red, and brown/white exclusively excavated at M1. A fragment featuring triple slip coating (red/orange/white) was exclusively found at AO1. The rest of the techniques involved appliqués (coils), incisions (parallel and chaotic thin lines <0.5-1.0 mm, done on leather hard clay), and corrugated external surfaces (present only at AO1 and AB3), as well as appendages (zoomorphic adorno at AO1 and M1, mammiform support exclusively at AO1, geometric supports, handles, and lugs on both AB and AO contexts, and a zoomorphic support at M1). Additionally, AB4 featured a sherd with red-on-white decoration. Chromatic preferences also include the minimal yet consistent presence of fine orange paste sherds, which contrast with the more common brownish tones.

Regarding lithic technologies, chipped stone industries are, along with ceramic fashioning and mound construction, a ubiquitous and continuous thread in human experiences throughout the valley of Juigalpa. In contrast, paralleling surface survey results, ground stone fragments were found in minimal quantities during excavations for the contexts analyzed in this section; only three fragments were retrieved from excavation unit AB4 (layers II and III, between 10-50 cm below topsoil). Chipped stone technologies at Alberto Obando were characterized by a flake industry (17.3 mm average longitude), with a preference for white 56.4%, purple 18.5%, and pink 8.7% chert for raw materials (Jiménez Castillo *et al.* 2019). Only 2.0% of the flakes presented marginal denticulated retouching, which did not feature techno-morphologic standardization related to a specific use and function (Jiménez Castillo *et al.* 2019). Additionally, five "Cuapa scrapers" (Rigat 1992) were retrieved from excavation unit AO1; this lithic tool is now being re-evaluated as a debitage core related to flake and sheets (Moreno de Souza *et al.* 2020) and with an earlier occurrence than previously outlined (Gorin 1990; Rigat 1992). These cores were absent within the Aguas Buenas units, whose chipped stone industry was also characterized by end products consisting mainly of small-sized flakes mostly manufactured from flint, as well as a few unifacial scrapers. In general, all chipped stone fragments seem to have been subjected to fire after their deposition, possibly as part of waste discarding processes. However, it is important to note that ceramic fragments did not show evidence of fire after discard, suggesting different disposal practices for the materials. Apart from that, the bifacial tools show intentional thermal alteration related to their manufacture as well (Jiménez Castillo *et al.* 2019).

As outlined in Chapter 2, rock art in the research area is characterized by sculpture, petroglyphs, and carved *metates*. Aguas Buenas is characterized for its large amount of petroglyphs, not only within the site (Vlaskamp 2012; Vlaskamp *et al.* 2014; Arteaga 2017; Auziņa 2018; Donner *et al.* 2018), but also in the surrounding ones, both mounded (Lázaro Villegas, Sebastián Ríos, Juan Suárez, and Adam Martínez) and unmounded: for example the particular case of Las Pocitas (Arteaga 2017; Donner *et al.* 2018). Petroglyphs were always found on bedrock outcrops, except for two samples that were "mobile" (carved on a piece of quarried bedrock). First, a spiral motif recorded on the surface at Barillas, and a second one, extremely relevant to the contexts discussed in this section, that was excavated from M34 at Aguas Buenas (Vlaskamp *et al.* 2014, 11). This petroglyph, which features lines and spiral motifs, was part of the construction materials, specifically one of the rocks forming the outside ring of the mound (Vlaskamp *et al.* 2014, 10). Since the construction of M34, part of the *Outer Arches*, is possibly related to the construction of M177 (cal 622 ± 20 CE), this would entail the first attempt to date rock carving practices at the valley. While sculpture has already been found in dated contexts (Gorin 1990; Rigat 1992; Arteaga 2017), petroglyphs had been elusive.[86] Now, we can confidently state that at least between cal 622 ± 20 CE and cal 1268 ± 12 CE, rock carvings were part of the lives of the dwellers of the valley, occurring with more intensity alongside the construction and practices of Aguas Buenas. The strong relationship between petroglyphs, geomorphology, and Aguas Buenas is clear in the distribution of the rock carvings recorded during survey (Arteaga 2017, 129; Donner *et al.* 2018) and the more detailed surveys conducted within the site itself (Vlaskamp 2012; 2014; Auziņa 2018). Examples of both two- and three-dimensional sculpture in clay, such as zoomorphic adornos and supports, and bas-relief representations on pottery, were excavated from Alberto Obando and Aguas Buenas. Even though no sculpture fragments or basalt columns in archaeological context have been found in Aguas Buenas or the sites within its vicinity (Arteaga 2017), the intersection between the itineraries of two- and three-dimensional representations in different materials of similar *subjects* should be explored.[87]

As stated in Chapter 2, no paleoenvironmental studies have been conducted in the area at the time of this research; therefore, it is important to discuss any relevant data available. Two samples from Aguas Buenas were tested through AMS for Carbon-13 (13C) signatures. The sample retrieved for mound 177 (M177) yielded -17.9%, which could be related to CAM plants, while the sample excavated at AB1 featured -27.2%, suggesting C3 plants. Even though

86 In spite of this, dating sculptures in context is also complicated due to decontextualization practices.

87 At Lázaro Villegas, located less than 200 m south of Aguas Buenas, a basalt column was found, but preliminary assessment of the excavated portion of this site—still yet to be fully analyzed—points to dates later than cal 900 CE. However, it is possible that other sections of the site might be earlier or later than this hypothesized time frame.

macro and microbotanical analysis of the excavation units is still underway, preliminary results have identified several starch grains and phytoliths within a sample excavated at AO3 that shared stratigraphic relationships with the charred residues dated through AMS. Even though identification was not possible, the starch grain yielded evidence of a dry cooking environment involving high temperatures, while most phytoliths were grouped within the Poaceae family, and one was identified as maize (Angeles Flores 2019). This limited evidence represents a unique insight regarding ancient foodways, particularly placing the production and consumption of maize related dishes as early as cal 300 CE for the valley of Juigalpa. Since no ancient faunal remains were collected in association to these contexts, it is not possible to establish consumer-consumed and hunter-prey relationships. However, ceramic tools possibly related to fishing practices were excavated at M1 in Aguas Buenas, so it is feasable that the builders of at least this structure procured fish from the streams and rivers throughout the valley, and maybe also from Lake Cocibolca as well. Apart from that, representations of animals in ceramics (usually 3D) and rock art (2D) are common (Vlaskamp 2012; 2014; Arteaga 2017), and they evince relationships between humans and—at least—small to medium sized mammals, reptiles, amphibians, and birds. These interactions were deep enough to inspire their planning, modelling and carving, and maybe one of the many unintended consequences (Joyce 2004) of these palimpsests is memory work. In lieu of the absence of zooarchaeological remains to further illuminate the interactions of humans and fauna, it is possible to at least ascertain glimpses of them through these representations.

Stratigraphy at Aguas Buenas was quite homogenous, with the core of material culture present in one single soil horizon (AE) for all excavation units except for unit AB3, which featured the highest cultural intensity in horizon AB, right below AE. The earliest radiocarbon date from Aguas Buenas was excavated precisely within this soil horizon (AE)— containing ceramics, chipped stone, and burnt clay—and yielded cal 486 ± 65 CE. Therefore, practices at the *Empty Area* of the site, and possibly within the *Central Area,* predate the construction of the mounds forming the *Outer Arches*, which dated to cal 622 ± 40 CE. For Alberto Obando, excavation units also yielded one main stratigraphic unit impacted by human practices: horizon AB for excavation units EAO1 and horizon AE for excavation units EAO2 and EAO3. At excavation AO1, within horizon AB, a sherd with charred incrustations on its internal surface dated to cal 433 ± 97 CE and was found in stratigraphic association with other ceramics, chipped stone and burnt clay. Variations in the ubiquity of various types of traces of human presence in the different soil horizons might then be interpreted as a result of depositional processes related to the location of each excavation unit in relationship to the slopes that characterize the area and is not necessarily suggestive of temporal differences.

Since sedimentation and soil formation processes in these kinds of contexts are subject to constant erosion, taphonomic and stratigraphic analysis should be undertaken cautiously. For example, all sites located within this same geomorphological unit (Lázaro Villegas, Sebastián Ríos, Aguas Buenas, and Alberto Obando) featured faunal remains of European-introduced species—particularly *Bos taurus*, due to contemporary cattle ranching practices—within levels and layers where archaeological materials were found (Gill *et al.* 2019). Also, attempts to date these sites using charcoal fragments (Aguas Buenas, n=2) and charred seeds (Lázaro Villegas, n=1) were unsuccessful. In spite of the above, stratigraphic analysis, in combination with the evaluation of the material evidence previously discussed, allows for certain interpretations to be made regarding the sites' chronology and use.

A comparative overview between Aguas Buenas and Alberto Obando can shed more light on human experiences at the valley between cal 300 - 900 CE. To begin with, both sites share low material densities on the surface, which are not linked to depositional processes, since—as stated above—sedimentation is very thin in this portion of the valley, featuring highly shallow stratigraphic columns and mixed deposits, which can represent thousands of years in a few centimeters (Donner & Geurds 2018). However, it is important to note that off-mound ceramic fragments at Aguas Buenas yielded higher erosion than those excavated at Alberto Obando, possibly suggesting a longer surface exposure after their deposition in spite of similar stratigraphic positions. These differential post-depositional erosion processes might be connected to how the sites were experienced. Therefore, Aguas Buenas was possibly cleaned regularly, which would have delayed soil formation processes, but material evidence apart from the mound construction events themselves is elusive.

The differential depositional histories of these two sites suggest that they were not used for similar purposes. The first impressions regarding Alberto Obando pointed towards a domestic use of the space, and analysis of the datasets partially supports this. For example, the different rates of variability among ceramic technologies related to all the different steps of the operational sequence suggest that Aguas Buenas' practitioners were much more socially heterogeneous than Alberto Obando's. Ceramic manufacture suggests that Aguas Buenas ceramics were produced following different microtechnical traditions, whereas Alberto Obando's assemblage was probably manufactured by a group of potters who had visual contact with each other during their learning processes. Also, construction of the geometric section of Aguas Buenas took at least 200 to 300 hundred years, whereas the building of Alberto Obando likely occurred within a much shorter time span.

Consequently, Aguas Buenas—at least between cal 400 and 700 CE—was not "permanently" occupied but was visited by several different communities who built it and possibly used it for gatherings related to the consumption of food and drinks (Donner *et al.* 2017; Geurds & Terpstra 2017), which were possibly associated with the main goal of the site: the construction process itself (A. Geurds, pers. comm. 2019). The assiduity of these gatherings is unclear, but the depositional history of the site suggests that it was probably cleaned—even of vegetation—for most of the year and shows no stratigraphic "gaps", indicating continuous periodic use for a certain amount of years, with uses of lower intensities both before and after that time frame. Even though the architectural geometric patterns of the site suggest design and planning, construction techniques are variable (Geurds & Terpstra 2017; Auziņa 2018). Therefore, both ceramic and building technologies are highly variable within the site and imply the confluence of divergent microhistories in one monumental project. Radiocarbon dating suggests its transgenerational nature as well.

In contrast, Alberto Obando seems to correspond with a house or groups of different houses belonging to a cohesive social group that probably lived in or used the site for a limited number of generations. Mounds circumscribing the flat central area of the site were highly standardized in measurements (both width and height), construction materials, and their relationship to the landscape (sometimes defying topography, a trait shared by Aguas Buenas' structures) (Arteaga 2017). Thus, both morphological and technological aspects of these low platforms were consistent, and excavations suggest that most of the practices, including differential firing of waste disposal, were performed in relationship to these mounds. The two larger mounds, located within the geometric configuration, yielded considerably lower amounts of material culture, so it is possible that some of the mounds circumscribing the circular configuration were mainly used for daily practices, such as cooking and processing food and other materials. In contrast, the large mounds may have been related to practices involving less material culture, such as sleeping, eating, gatherings, and other communal activities. The largest mounds do not show an accumulation of any type of commodities, so their size does not necessarily imply a social hierarchy within the community. Instead, it may suggest differential practices that involved a larger number of people that necessitated additional space.

The results of this research prove that cooking practices in Alberto Obando predate these practices at Aguas Buenas; therefore, construction of Alberto Obando was clearly the first perennial architectural effort in the valley, followed by Aguas Buenas. However, that does not necessarily mean that Aguas Buenas was not a landmark and place of memory beforehand. In fact, it is possible that it had been used for centuries preceding its monumental architectural construction by communities possibly living on the Juigalpa plateau, in the mountains surrounding the valley, or by the Cuisala river south of Juigalpa. This is evinced by the fact that practices performed at the *Empty Area* of Aguas Buenas predate the construction of the *Outer Arches*.

The first frame of this time lapse starts with a valley that is both similar and different from the one observable today. Human transformations not only consisted of the modern urban area of Juigalpa, the construction of roads, and the architectural endeavors of the ancient dwellers. Deforestation related to urbanization and economic activities, such as cattle ranching, have dried the valley, resulting in profound transformations of water flows, animals, plants, soils, and people. Therefore, ancient communities might have lived in a slightly different valley, where water, food, and several materials used in daily practices were readily available. Dwellers of the valley were familiar with all its flows and intersections. The construction of architectural structures commenced

Figure 225: Example of a contemporary house in the area, for which bedrock was used as a foundation (credit: Alejandro Arteaga).

at Alberto Obando, a small place for permanent or seasonal living. Then, several communities—maybe including the dwellers of Alberto Obando—shared certain views that led them to monumentally transform the valley. This constellation of practitioners shared certain ideas, such as mound building, ceramic manufacture, chipped stone cutting implements, the practice of carving rocks, a geometric sense of built space that mainly followed an elliptical logic, and a strong relationship with seasonal streams that made them preferable to permanent rivers. Unfortunately, paleoecological data is lacking in the area, but these factors could suggest a much more humid valley, in which architectural efforts were only made on the slopes of the mountain range due to possible overflows of the Mayales river and the Carca streams during the rainy season, as well as the vertisol floodplain to the south. The shallow soils of this upper part, in combination with secure bedrock outcrops, could have formed a very good foundation for architectural structures as evinced by the excavation of mounds at Aguas Buenas and by the construction practices today (**figure 225**). Also, the excavation of bedrock at Alberto Obando not only evinces the possible extraction of materials for construction purposes, but also the idea to maybe elevate and channel access to the mounded area. In Aguas Buenas, a similar feature—an access—was also created but instead served as a pathway that cut across the *Outer Arches* and led to the *Central Plaza*. Gathering, cooking, serving, building; doing all these things together were practices shared by these communities, which possibly formed a constellation of practices that bonded different social groups, as evinced by ceramic manufacture.

To summarize, human trajectories in the valley of Juigalpa between cal CE 300 and 900 entwined the utilization of local and regional knowledge for the construction of perennial structures that—at least at Alberto Obando—possibly supported perishable

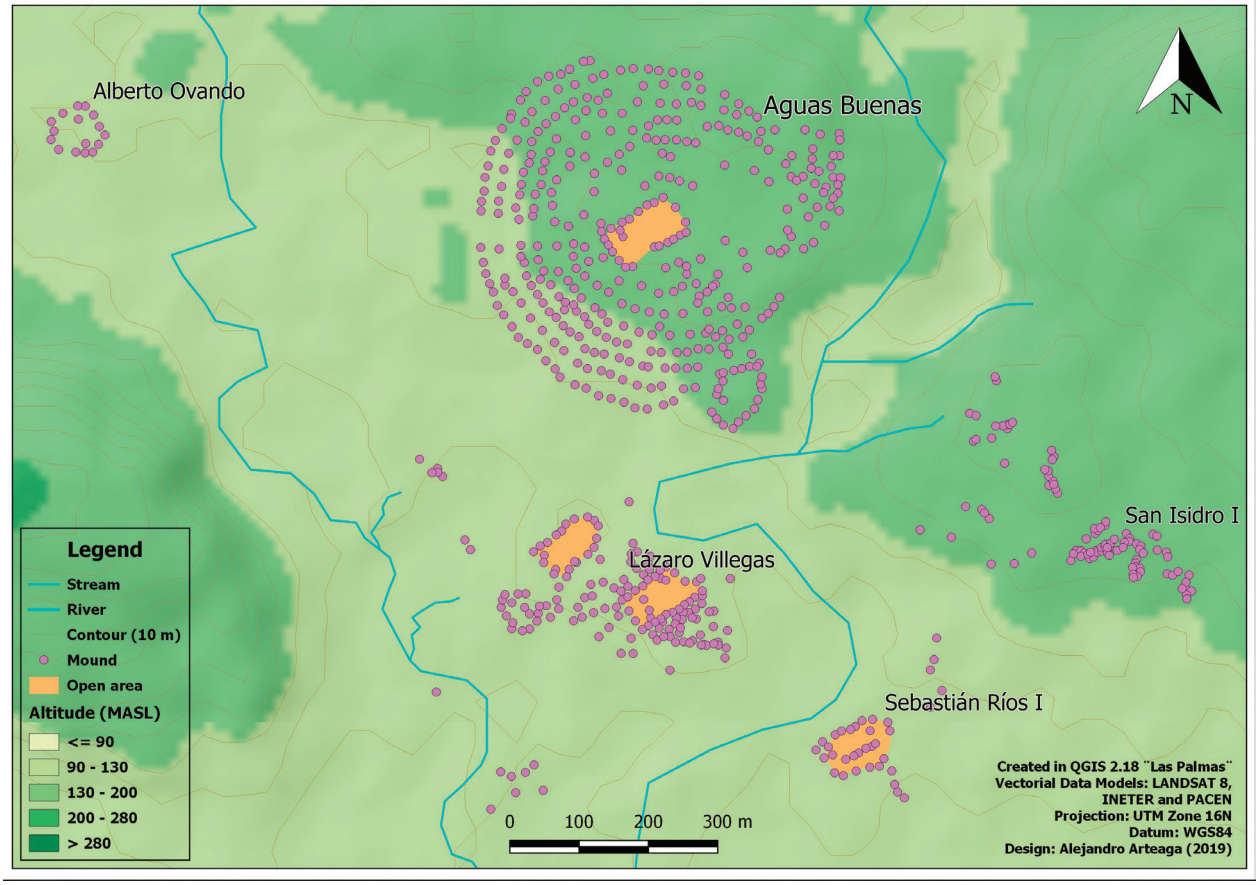

Figure 226: Map with AB and surrounding sites, featuring quadrangular mounded configurations (credit: Alejandro Arteaga).

buildings. Life was marked by seasonality, monumentality, and mobility; transformation of the landscape involved geometric patterns. Dwellers did not prefer the valley for long term commitments beyond the safe dry foothills of the Cordillera Amerrisque, and sites were not intensively used, as the low densities of material culture suggest. While Alberto Obando appears to be the effort of a single community and was likely occupied between one and three generations, Aguas Buenas clearly involved the participation of several communities throughout and possibly beyond the valley for many more generations. Ceramic analysis of the earliest portions of the site (AB3, AB4, AB5, AB6, M1) show critical technological coherence with the Alberto Obando assemblage but also divergence. For example, the ceramics excavated at M1 yielded sherds coherent with Pacific Nicaragua technical traditions (C. Dennet, pers. comm. 2019), as well as fragments identified as part of the Sulaco valley technical complex in Honduras (R. Joyce, pers. comm. 2018), and they are also characterized by recurrent tempering with grog, while that paste preparation practice is virtually absent not only at AO, but at the rest of the sites analyzed for this book (except for one single sherd excavated at OP1). Moreover, a recent geochemical clay procurement study established that clays employed for manufacturing the ceramics retrieved at M1 in Aguas Buenas were of local origin (Casale 2017). At the same time, fashioning and finishing are similar, with a preference towards wet clay and end products dominated by cooking preferences related to unrestricted vessels.

There are several other sites surrounding Aguas Buenas apart from Alberto Obando, including Lázaro Villegas, Sebastián Ríos, and Alcides Montiel. Unfortunately, analysis of the results of the excavations conducted at these sites have not

been completed yet, so their relationship to Aguas Buenas remains obscure. Radiocarbon dating at the base of the main mound of Alcides Montiel, located less than 1 km south of Aguas Buenas yielded cal 767 ± 98 CE, which strengthens the idea that at least some of the mound clusters located immediately around Aguas Buenas could be directly related to it. Apart from that, the *Central Area* of Aguas Buenas, a quadrangular architectural configuration 65.0 m long, comprised of less than 30 mounds distributed in a rectangular designed over a flat terrain (Auziņa 2018, 90-91), shows strong similarities with architectural features present in Lázaro Villegas and Sebastián Ríos **(figure 226)**. These two sites also have two quadrangular plazas—as defined by Arteaga (2017)—with a NE-SW orientation identical to that of Aguas Buenas' *Central Area*, with similar measurements, a comparable number of mounds, and similar topography. At Sebastián Ríos, the quadrangular architectural feature also shares with Aguas Buenas the presence of an inner and outer rectangle of mounds. Arteaga proposed that Alcides Montiel might also have had a rectangular configuration such as the ones described, which was destroyed by the construction of the La Libertad road (Arteaga 2017, 252). This observation, based on spatial analysis, strengthens the possibility of a chronological connection between the sites forming the Aguas Buenas mound cluster.

8.2.2 WATER WORLDS (CAL 900 - 1250 CE)

The next sites in this time lapse were built following similar technological concepts, such as the utilization of quarried bedrock, sediment, and non-organic debris for structuring and filling purposes; however, evidence for the first wattle-and-daub structures, which were possibly placed on top of the mounds, was found. These structures could have also been built as fences to create spatial divisions (A. Geurds, pers. comm. 2019), and while these separations could have been aimed at humans, they could have also involved small animals. Apart from that, there is a departure from the previous geometric forms regarding spatial configuration, and at least three different ways of relating to the landscape are present. First, Aguas Buenas continues to be constructed, but these efforts occur on its eastern side and no longer follow geometric patterns. Practices during this interval are more intense, reflecting human presence for longer periods of time or more repeated occasions throughout the year. Ceramic technologies at AB2 reflect both variability and homogeneity, suggesting a group of potters less cohesive than at Alberto Obando. Technical continuity between Alberto Obando and Aguas Buenas at this moment could suggest that the builders of AO relocated closer to it, together with other related groups that were now part of the same community of practitioners. Spatial logic of these new structures built at Aguas Buenas does not follow the larger geometric pattern but seems to delineate the meandering stream. Also, practices showed more intensity around a large oval platform (M366). This is also a relevant contrast from Alberto Obando, where the largest and most centrally located mound did not yield the highest material culture densities—which was also the case at Alcides Montiel and seems therefore to be characteristic for sites built between cal 300 and 900 CE. This new preference for more intense practices related to the larger mounds within sites is shared with other sites that are contemporaneous to this section of Aguas Buenas (AB1 and AB2), such as Oporta. Also, these places feature flat portions of terrain surrounded by mounds. The second group of sites (Oporta and JOR) are located on the banks of stream meanders (Carca and Manigua) and are also characterized by similar construction technologies that feature a non-geometric spatial logic and plazas surrounded by at least three larger mounds with high frequencies of material culture on their surface and in the subsoil. These sites are smaller agglomerations of mounds found in larger clusters that integrate various mounded sites within a 75.0 m vicinity (Arteaga 2017). The last group of sites (RAI, Sabana Grande, La Pachona) is located in relation to fresh water sources and elevations. Apart from yielding the highest variabilities regarding ceramic technologies, they evince intensive production of ceramics and lithic artifacts, probably for both consumption and trade, as suggested by the higher ubiquity of imported ceramic materials. Therefore, an increasing social diversity—which could also be linked to a population increase—is evidenced not only by the higher variability of technical traditions found in the ceramic assemblages, but also by the increased presence of imported ceramics. Apart from that, Sabana Grande and the northeastern sector of Piedras Grandes II featured sculpture fragments. This last group of sites was studied before by Magnus (1975b; 1975a), Gorin (1990), and Rigat (1992). La Pachona is now under examination by Roosmarie Vlaskamp (Leiden University), while RAI is being

investigated by Irene Torreggiani (University of Oxford). Therefore, analysis is concentrated on the first two groups of sites, along with insights concerning the third group.

Ceramic technologies in AB2, OP1, and JOR2 have distinct trajectories, in which OP1 and JOR2 seem to intersect more often with each other than with AB2. To begin with, the ratio between unrestricted, restricted, and unidentified vessel shapes was consistent, with 88.0%-8.0%-4.0% for AB2, 34.0%-48.0%-18.0% for OP1, and 34.0%-50.0%16.0% for JOR2. Differences in vessel shapes may be related to divergent foodways, which could be both related to context (Aguas Buenas vis-a-vis Josefa Ocón Robleto and Oporta) and content (differential lifeways). Excavation units OP1 and JOR2 were both located next to low circular platform mounds, which were hypothesized to hold a perishable structure on top that possibly served as a household. However, OP1 consisted of an approximation trench at the foot and inside of a mound, while JOR2 was situated in a flat area in between two mounds, a few meters away from them. Material evidence from OP1 suggests an intense use of on- and off-mound sections and a wattle-and-daub structure, with waste discarded at its base. In contrast, the context excavated at JOR2 seems to be related to cooking practices or the preparation of other substances (see stratigraphic discussion below). Even though AB2 is also hypothesized to be in a residential area, ceramics suggest different practices involving more unrestricted vessels and less restricted. This is possibly connected to divergent cooking, storage, and serving practices.

Table 23 outlines the most common vessel shapes at each excavation unit in decreasing order; even though morphologies and their ubiquity were fairly coherent across the three different excavation units, there is variability in the sizes that will be briefly examined. In general, *ollas* tended to be slightly smaller at JOR2 than at OP1 and AB2 and outflaring straight walled jars (CRD) reached larger proportions at JOR2 in comparison with the two other excavation units, while straight walled jars (CR) achieved smaller sizes at OP1. AB2 yielded larger curved jars and plates (P), and OP1 featured larger convergent straight walled jars (CRC) than the rest. These differences may relate to the divergent excavation contexts and practices associated to them. Other vessel shapes present in the sample are *molcajetes* (at JOR2, OP1, and AB2) and colanders (AB2 exclusively), which entail differential culinary practices involving grinding of soft or wet species, as well as sieving and steam boiling. Colanders were also present at Sabana Grande, La Pachona, and Roberto Amador.

Excavation unit	Vessel shape	⌀ (cm)	Wall thickness (mm)
JOR2	Ollas	4.0-22.0	5.0-10.0
OP1	Ollas	6.0-34.0	3.0-9.0
AB2	Ollas	7.0-30.0	4.0-12.0
JOR2	CRD	8.0-45.0	3.5-10.5
OP1	CRD	12.0-36.0	3.0-11.0
AB2	CRD	8.0-30.0	4.5-8.5
JOR2	CR	14.0-45.0	5.0-10.5
OP1	CR	4.5-31.0	2.0-11.5
AB2	CR	17.0-45.0	5.0-7.0
JOR2	Curved jars	20.0-35.0	4.0-8.0
OP1	Curved jars	10.0-25.0	4.0-6.0
AB2	Curved jars	15.0-50.0	4.5-9.0
JOR2	CRC	20.0-22.0	5.0-6.0
OP1	CRC	9.0-35.0	5.0-8.0
AB2	CRC	5.0-18.0	5.0-7.0
JOR2	P	11.0-30.0	4.0-7.5
OP1	P	30.0	5.0-7.0
AB2	P	40.0	4.0

Table 23: Outline of the most common vessel shapes within the sample excavated and analyzed.

Ceramic technologies at these sites develop different series, meaning that a set number of paste recipes were used in different frequencies and grain sizes. This might suggest diversification connected to standardization, possibly suggesting a higher degree of specialization when comparing with earlier pottery traditions. As mentioned above, it could also be connected to higher numbers of producers. Production was possibly still conducted at the household level but may have become more concentrated in certain households or groups of people within the community. Paste preferences involved very coarse to medium (JOR2), very coarse to fine-silt (OP1), and granule to fine (AB2) local clay recipes. At JOR2, all petrographic groups featured paste preparation practices (sieving, sorting, and tempering), while OP1 and AB2 also

yielded clay sources that were used as-is. At all three excavated contexts, sieving was usually followed by tempering but was not a prerequisite for adding anti-plastics. Intentionally added materials consisted of both volcanic rock inclusions as well as quartz and feldspars at JOR2 and OP1, but only quartz and feldspars at AB2. Therefore, concerning paste preparation, tempering practices at AB2 evince continuity with the materials excavated at AO1, AB3, AB4, AB5, and AB6, while they diverge from JOR2 and OP1. In this sense, OP1 could possibly show connections with Aguas Buenas M1 because they are the only contexts where grog was identified for clay recipes related to the manufacture of an incised *olla* (OP1.62.1), which was identified as Santa Barbara from the Ulúa Valley in Honduras (R. Joyce, pers. comm. 2018). Grog is not reported by Gorin (1990, 718-741) for central Nicaragua, nor by Dennett (2016, 177-210) or Platz (2015) for Greater Nicoya ceramics, both from Nicaragua and Costa Rica—also present in the sample. Other paste preparation practices involved sorting at AB2, and OP1 featured several unique traits, such as tempering with grog—only present in one sample—mixing of clays, and one petrographic group that is characterized by a geology connected with intrusive igneous rocks. The rest of the samples analyzed for all sites in this manuscript featured extrusive igneous rocks instead. Additionally, OP1 yielded samples with higher contents of volcanic glass and ash, which could suggest different geological backgrounds related to clay outcrops.

Fashioning involved coils between 0.4 and 2.5 cm, with a clear tendency in all excavated contexts towards coils between 1.0 and 1.5 cm. This suggests socially learnt bodily gestures connected to separating the clay mass into parts of similar sizes, which were then worked through rolling gestures for creating coils. These coils were then placed equidistantly with oblique movements, usually from outside to inside at JOR2 and OP1, but also from inside to outside in slightly fewer cases. At AB2, variability in these gestures was higher, also featuring oblique movements, but mostly inside to outside, though opposite and alternate modes were also present in minor quantities. Bases were fashioned through spiral coiling movements at all three contexts, which suggests connections among the potters in the sense of specific transmitted knowledge, possibly from generation to generation but also between peers. At JOR2, lip coils were either the same size of the rest of the vessel's coils, smaller, or larger. At OP1 they were either the same size or smaller, and at AB2 they were of equal size or larger.

Pressure was exerted through pinching and drawing bodily gestures, and pre-forming was conducted on wet clay at both JOR2 and OP1, with traces related to scraping with a tool or the fingers at JOR2, as well as a scraper (7.0-10.0 mm wide) and calabash shell at OP1. At both sites, tool marks were usually identified in the interior surfaces, which could be interpreted as specific bodily gestures connected to tool use for the internal walls of the vessels combined with the free hand and fingers as support for the external walls. Again, these gestures suggest strong ties in the learning processes of these potters. AB2 featured a unique combination of wet clay techniques, such as scraping with a soft tool or finger—either dry or re-hydrated in the majority of the samples—but also leather hard clay shaving, as well as smoothing with re-hydrated fingers. The identification of both techniques in one sample suggests integration of different techniques rather than divergent potting traditions. Also, leather hard clay techniques were suspected for some samples at JOR2 and OP1, but later surface treatment may have erased the traces. Smoothing was usually done in leather hard clay with a soft tool, and both JOR2 and AB2 featured unusual burnishing, which was more common at OP1.

Coating with slips or *barbotine* was common, but with different frequencies: 44.0% at JOR2 (mostly red, but also orange and brown), 90.0% at OP1 (red, orange, and brown), and 71.0% at AB2 (red, reddish brown, bright orange—distinctive for this assemblage—brown, and minimal white, only present in one single macrofabric group and outliers). Other decorative techniques were also recorded, again with different frequencies depending on the excavated context (7.0% for JOR2, 12.0% for OP1, and 15.0% for AB2). Incisions, appliqués, paint, and appendages were present at all three excavation units but suggested both divergent and convergent itineraries. For example, all contexts feature bands of subparallel incised lines oblique to each other, both on internal and external surfaces, and also criss-crossed lines incised on necks and shoulders of *ollas*. Moreover, combined decorative techniques were also present, generally integrating appliqué with either punctuations, incisions, or impressions. *Acanaladuras* were absent at AB2 but present in the other two units. Carca rims were present at OP1 and possibly also at JOR2, but they were absent at AB2. Paints and slips were also

combined for decorative purposes, and OP1 yielded a bright orange paint that is possibly related to the most ubiquitous decoration in AB2: a double slip formed by a red layer on top of a bright orange layer. JOR2 only featured one double slipped fragment, while the technique was absent at OP1. At AB2, double slipping also combined, in lower quantities than the red/orange tones, red on white and orange on brown. Paint (black, brown, orange, red) was also applied on slipped surfaces (red or white). Additionally, AB2 was characterized by the presence of annular bases; while it is possible that two samples at OP1 also featured them, they are too fragmentary to confirm. Firing was usually conducted in controlled, partially oxidizing atmospheres at temperatures below 750 °C, with higher temperatures in one petrographic group at OP1 and AB2. The latter unit also featured a complete oxidation atmosphere.

At JOR2, a braided handle is reminiscent of the diagnostic Cuapa handles characterized by Gorin (1990, 483); however, manufacturing techniques are different. The particular handle shape at JOR2 was achieved by braiding two coils each measuring 1.3-1.4 cm in diameter, whereas the ones reported by Gorin braided four coils together each measuring 0.7 cm in diameter (Gorin 1990, 483). Other fired clay objects were found both at OP1 and JOR2. At JOR2, clay balls, a seal fragment, and beads—similar to those excavated at La Pachona (R. Vlaskamp, pers. comm. 2016)—were recovered. Apart from that, imported materials from Pacific Nicaragua (C. Dennett, pers. comm. 2019) and Honduras—which usually feature higher frequencies of volcanic ash and glass—were identified in all contexts (R. Joyce, pers. comm. 2018), and JOR2 also featured a fragment of a sherd traditionally ascribed to the León Punteado type. Finally, the JOR2 assemblage is characterized by well-defined use-alteration traces suggesting boiling and over-boiling, while the other two contexts did not yield these kinds of traces. Therefore, the preparation of dishes in a specific way that implied these higher temperatures was done at JOR2 but not at the other two sites. These higher temperatures (up to 300° C), achieved by overboiling, could also explain the absence of zooarchaeological remains in the sample, because their exposure to such heat combined with the generally poor preservation within the research area would have disintegrated them (Gill *et al.* 2019).

Itineraries of lithic technologies show new intersections with the introduction of a bifacial industry, which is only associated with contexts dated between cal 900 and 1250 CE (Jiménez Castillo 2017, 15). Bifacial artifacts and their by-products were only identified at Roberto Amador, Oporta (OP1), Sabana Grande (LD1), and Aguas Buenas (AB1) (Jiménez Castillo 2017, 15) as well as at La Pachona (Pothuizen 2016). Their absence in both previous (AO1, AB3, AB4, AB5, AB6, AB-M1) and contemporary units (JOR2) could be related to contextual differences rather than suggesting a technological shift (Jiménez Castillo 2017, 15). In fact, this presence-absence interplay is another transect of the valley that can shed light on human trajectories. The multiplicity of excavated contexts provides sufficient data to sustain the hypothesis that, even though it is possible that bifacial technology was known and used before cal 900 CE in the valley, there is no evidence to propose that it was produced and used at the excavated sites. The numerous chipped stone surface scatters throughout the valley could be related to this time frame, so maybe their absence in excavation units is related to transformations in production practices—for example from production at or near procurement sites to transport of raw materials to households-workshops. Also, it could indeed be related to how sites such as Alberto Obando and Aguas Buenas were conceived and used by their constructors, which possibly did not entail practices requiring bifacial technology. In either case, human trajectories in the valley implied the production and utilization of bifacial technology at mounded sites, which can be proposed as a "chronological marker" for the research area. Apart from the introduction of bifacial technology, sites dated from cal 900 CE on also see the novelty of obsidian use throughout the valley. Even though fragments are scarce, they seem to be the result of the debitage of small nodules, which are consistent with the sources reported by Garayar (1972) for the research area and the region surrounding it. Therefore, it is possible that obsidian was procured locally, but its introduction may be related with the participation in certain constellations and networks of practices that entailed obsidian work and use.

Regarding rock art, no petroglyphs were found at the excavated contexts except for the ones at Aguas Buenas, which—as discussed before—might be related to the process of constructing the site. In contrast, three-dimensional stone sculpture was found in context at the surface of two sites, Sabana Grande and Piedras Grandes II (Arteaga 2017), which are both located by the Carca-Copelito stream. Basalt columns, which could be related to sculpture carving practices, were found both at Josefa Ocón Robleto and Oporta.

These finds—especially the sculpture fragments—are indeed remarkable in light of the large private and public collections. For example, the Museo Arqueológico Gregorio Aguilar Barea stores more than 100 sculptures of human and animal-like figures with little information regarding their provenience (Geurds *et al.* 2018, 124). In spite of this, provenance by means of geochemical techniques has proved to be promising (Pietersen 2012). Also, numerous fragments can be found in small informal collections at local houses (Arteaga 2017). Again, this shift in sculpting practices could be related to a contextual bias, but a reflection on the possibilities of changing rock art itineraries is also worthwhile. Stone sculpture in the research area is monumental, and manufacturing practices involved several lithologies—mostly igneous, but also some sedimentary rocks—for raw materials (Pietersen 2012, 53) and an ambiguous style (Geurds *et al.* 2018). The monumentality of stone sculpture in the valley was not necessarily always associated to architectural monumentality, as evinced by its absence of this type of materials at Aguas Buenas.[88] However, from cal 900 CE onwards, sites with monumental architecture, such as Sabana Grande, did yield stone sculpture. Sabana Grande is comprised of 80 mounds but is part of a larger cluster that encompases four other sites, including Piedras Grandes II, where the other sculpture fragment was located, and Josefa Ocón Robleto (JOR2). Therefore, petroglyphs seem to be connected with a geometric spatial logic, while sculpture could be linked to site clusters without a specific spatial arrangement. Apparently, this relationship between monumental sites, including different clusters of mounds in relationship to permanent streams without clear spatial arrangements but featuring open spaces surrounded by mounds of various sizes and morphologies, constituted part of human experiences in the valley at the time.

Paleoenvironmental data is limited to samples that were tested through AMS for Carbon-13 (13C) signatures. Samples at Oporta (OP1) yielded both -18.5% and -25.7% values, which could be related to CAM and C3 plants respectively. At Roberto Amador, samples yielded similar values, with -18.5% in a mound context (RAI-M25) and -25.3% at excavation unit RAI1. At Josefa Ocón Robleto, -15.9% was obtained, which could be related to either C4 or CAM plants. Finally, Sabana Grande featured the highest quantity of samples and most variability, with values of -8.6%, -19.8% and -25.7% at excavation unit LD1, suggesting C4, CAM, and C3 plants; while unit LD2 yielded -24.6%, coherent with C3 species. Starch analysis on one sample excavated at AB1 suggests consumption of maize (R. Angeles Flores, pers. comm. 2019), but no other microbotanical data is available for now. In contrast, zooarchaeological remains were extremely abundant for these contexts, which is also an important difference compared to earlier sites, such as Alberto Obando and Aguas Buenas earlier units. This again may be due to sample, contextual, or preservation bias, or reflect differential practices—which can also be in turn related to context, not necessarily reflecting transformations in foodways and human-animal entanglements.

Stratigraphic analysis suggests that the dwellers of Oporta dealt with flooding episodes of the Carca-Copelito stream, while apparently the ones at JOR2 did not encounter such problems. It is possible that the reconstruction of mound OP15 (associated to excavation unit OP1) was somehow related to these flooding episodes but could also be connected to vermin issues or the necessity to expand the mound, among other reasons. The renewed construction effort, though, first evinces curatorial practices related to actual mound use within the valley. Within Aguas Buenas, it is unlikely that perishable structures were built on top of mounds (Auziņa 2018; A. Geurds, pers. comm. 2019). At Alberto Obando, this relationship between mounds and perishable structures on top of them is hard to assess. Even though burnt clay was found at both Aguas Buenas and Alberto Obando, quantities were minimal, fragmentation was high, and no samples evinced the imprints of wooden logs that suggest wattle-and-daub construction practices. That kind of evidence was indeed archaeologically recovered at least from OP1, so clay-based architectural practices were combined with the technologies involved in mound construction. Possibly, the type of sediment utilized for these clay structures is the same one as the one employed today, *lanilla* (E. Castillo, pers. comm. 2016), and the imprint diameter suggests thin tree stems or trunks, which is also habitual nowadays. A main difference between current clay architectural practices and ancient ones could be the absence of grass in the clay

88 Even though sculptures could have been removed from the site, Geurds intensively reviewed the collection at the Museo Arqueológico Gregorio Aguilar Barea and conducted interviews with the land owners of Aguas Buenas, producing negative results (A. Geurds, pers. comm. 2019).

mix within the archaeological samples. According to locals, *lanilla* soil does need tempering materials in order to achieve the right plasticity and stability required for architectural purposes—and also for making ceramics, if combined with other clays—so it is nowadays mixed with grasses. Further analysis of the archaeological samples will clarify which kinds of materials were intentionally added for these purposes, but it can confidently be stated that grass was not used.

Stratigraphy at OP2, situated in a flat area surrounded by large mounds, elicited trampling associated with floor surfaces, suggesting this open space was used for circulation and practices related to the largest mounds within the site. Excavation unit OP1 was situated at the base of a mound, while JOR2 was located between two low mounds. Analyses of the stratigraphy and material remains found in each excavation unit suggest that waste was discarded right next to the structures, which were the foundations for wattle-and-daub buildings that required posts to hold a possibly thatched roof. Cooking might have taken place a few meters away from the architectural remains, kitchen areas were kept very clean, floors were swept, and at least the organic debris was burned and then deposited next to the mound. All the excavated sites that yielded radiocarbon dates between cal 900 and 1250 CE (Oporta, Sabana Grande, Roberto Amador, La Pachona, except Josefa Ocón Robleto) show an abundance of zooarchaeological remains. This contrasts their absolute absence in previous contexts. Even though poor preservation could have affected the chances of finding zooarchaeological remains, the complete absence at the earlier contexts of Alberto Obando and Aguas Buenas should be examined in light of the discussions—outlined above—regarding human experiences in connection to those sites, which might have not necessarily involved procurement, processing, consumption, and discard of animals, at least *in situ*. In contrast, all the sites dated between cal 900 and 1250 CE provided extremely useful insights into foodways related to animal dishes within the valley. To begin with, the archaeozoological sample as a whole evinces a clear tendency towards the consumption of mammals (72.0%), followed by reptiles and birds (12.0% each).[89] Bony fish, gastropods, and bivalves were also found in minimal quantities (less than 1.0%) (Gill *et al.* 2019). Exploited mammals consisted of mainly deer, medium and small sized species. Ratios of deer consumption are variable, with Sabana Grande and Roberto Amador sharing similar proportions (46.0% and 49.0% each), with much less ubiquity at Oporta (14.0%) and extremely high frequencies at La Pachona (65.0%) (Gill *et al.* 2019). Butchery practices connected to deer consumption were shared by all sites. At Oporta, Sabana Grande and Roberto Amador, these practices were also applied to smaller mammals. In contrast, La Pachona did share butchery practices of deer with the valley, but processing of smaller mammals showed variability and the possibility of several communities of practice (Gill *et al.* 2019). Therefore, divergences in the ratios of the different species among the valley sites could be related to social factors. For example, the two sites that yielded a considerable higher consumption of deer also evinced fish and bird remains, which are absent at Oporta.

Sabana Grande and Roberto Amador show strong connections with Pacific Nicaragua, as demonstrated by the consistent presence of ceramics either imported from that area or produced locally sharing their aesthetic and morphological standards. In contrast, Oporta shows more visible connections with Honduran materials. At the same time, all sites share the first occurence of obsidian and other practices such as wattle-and-daub architecture, bifacial technology, and zooarchaeological remains, for example. Therefore, several communities and constellations of practices were interwoven in the social landscape of the valley, combining shared butchery practices with divergent ceramic technologies, strong relationships with other areas that were both grouping and dividing dwellers of the valley, and differential foodways that might be connected to these wider constellations and networks of practices. The possibility of a certain degree of social differentiation should be explored, especially when taking into account variability in food and ceramic consumption.

Between cal 900 and 1250 CE, the valley experienced considerable transformations. To begin with, it seems that environmental conditions became dryer, allowing for construction practices at the foot of permanent streams and rivers. People still avoided—as they still do today—the floodplain, located at the center of the research area, for construction purposes, with agriculture, hunting, and procurement of raw materials instead practiced there (Arteaga 2017). The changing environmental conditions could be linked

89 Processing and consumption of these animals may have included the use of fur and feathers as well.

to several factors, but earlier volcanic eruptions in Pacific Nicaragua (Dennett 2016), in combination with the impact of deforestation practices that started at least during the construction of Aguas Buenas and Alberto Obando 600 years beforehand, might have contributed. It is apparent that different groups of people who were related to each other through different communities, constellations, and networks of practice decided to make the valley a more permanent home than before. Human populations increased, both continuing and departing from earlier forms of relating to the landscape. Sites usually comprised several mound clusters that lacked a clear geometric design, possibly suggesting a more organic growth; flat areas surrounded by large mounds were used for circulation and also practices related to food and beverage preparation and consumption; waste was discarded next to mounds with previous burning of organic debris; and kitchen areas appear to be outside of mounded structures and kept clean. These mounds held perishable structures and were possibly associated to three-dimensional stone sculpture. Lithic technologies beyond carving practices entailed the production of bifacial artifacts as well as obsidian work, which were absent before. Foodways seem to evince both continuity and departure from earlier traditions; new vessel shapes such as colanders and *molcajetes*, together with the high frequency of faunal remains, are evidence of some of these shifting tendencies. Sites were abandoned without traces of burning, flooding, or a less intense use; therefore, it is hard to assess which decisions led most dwellers of the valley to possibly look for alternative places to call home.

8.2.3 DISTANT NEIGHBORS (CAL 1250 - 1450 CE)

Radiocarbon assays dated between cal 1250 and 1450 CE were retrieved from two different excavated sites: Barillas (UBI), located by the Mayales river, and Rosa Dolores Oporta (RDO), situated next to the Carca stream. Since both sites differ in spatial configuration, number of mounds, building techniques, and material culture, they are discussed separately, and comparisons are drawn at the end of this section. However, it is important to mention that, for the first time since cal 300 CE, human experience within the valley of Juigalpa does not seem to be related to Aguas Buenas in any way or at least did not involve mound construction practices or the consumption of food and beverages at the site. Population densities decreased, and communities seem to be more disconnected than before, possibly due to the lack of a shared project, such as Aguas Buenas.

The people of the cliff

The Barillas site is a large group of 129 mounds located on a steep alluvial terrace of the Mayales river. The site was constructed following the valley's technical tradition, which integrates quarried bedrock fragments, sediment, rocks, non-organic household debris, and the utilization of natural bedrock elevations as foundations for structures. Clay architecture was also practiced at Barillas, as evinced by a fragment of burnt clay excavated at UBI3AA, which shows the imprint of thin trunks on one side and a flat surface on the other. A particularity of the mounds at Barillas is the inclusion of small river cobbles to fill mounds, something that was not observed in excavations at other pre-Hispanic sites. Apart from that, the site features a spatial organization that combines open flat areas surrounded by mounds, mortars carved on bedrock outcrops (both next to mounds as well as a few meters away), and a spiral petroglyph.

Regarding ceramic technology, end products showed a clear tendency towards unrestricted shapes (75.0%), which shows continuity with sites such as Alberto Obando and the earliest sections of Aguas Buenas. The variability in paste recipes identified at the site—both macro and microscopically—denotes the utilization of various local clays, possibly all procured at the vicinity of the site by the shores of the Mayales river. The simultaneous exploitation of several nearby clay outcrops could be connected to other practices related to the Mayales river, such as agriculture, hunting, fishing, and the procurement of raw materials, wood, and water. In fact, paste preparation involved all of these practices, since tempering, sieving, and mixing—all requiring surveys to collect raw materials and tools—were all identified in the sample analyzed. Apart from that, the combination of variability in raw material exploitation with the creation of several ceramic series implies a well-developed manufacturing tradition rooted in knowledge of the environment, as well as the pottery production process, and the challenges of different consumption practices. For example, tempering practices were identified as functional (Donner *et al.* 2019), and mixing of clays was carried out for certain vessel parts, such as bases.

In this case, combination of different clays was not necessarily functional, with the base featuring finer grain sizes that the vessel walls.

Heterogeneity in clay recipes is contrasted by a very homogenous roughing-out process, including coils exclusively between 1.0 and 1.5 cm. An exception are the *comales*, a newly introduced griddle-like shape produced following local microtechnical traditions and featuring larger coils between 1.5 and 2.5 cm. The function and use of these vessels apparently not only determined production choices reflected in paste preparation but also in coil size. Coiling technique was extremely homogeneous, with specific gestures repeated all over the sample analyzed, featuring alternate and oblique positioning followed by pinching and drawing. Finishing was undertaken on wet clay without the use of a hard tool, and surface treatment involved leather hard clay smoothing and coating with slips. Decoration techniques aside from slipping (66.0%) were very scarce, only present in 2.0% of the assemblage. Firing was also fairly homogenous, with oxidizing atmospheres prevailing.

The contrast between clay procurement and paste preparation variability and highly homogenous fashinioning, finishing, surface treatment, firing, and decoration techniques reinforces a hypothesis based on local production with some degree of functional variability, at least for operational sequences Barillas-I, Barillas-II, and Barillas-IV. Bodily gestures and tool kits were shared by a group of potters that learned their craft in a very similar context. The exception—and reinforcement of this idea—is operational sequence Barillas-III, which not only implied divergent clay procurement and preparation practices, but also a highly standardized technical approach with regular sizes of coils—which always measured 1.0 cm—as well as differential firing practices. Apart from that, it is the only technical group featuring a very fine matrix, while the rest of the assemblage at Barillas, regardless of the function and use of sherds, were manufactured with coarse to very coarse pastes. All these traits, combined with a preference for adding supports as appendages—not exclusive to this sequence—denote common technical and aesthetic perspectives that are, in contrast to the rest of the operational sequences, identified as local. While it is certainly possible that this clay was procured elsewhere—it is the only petrographic group lacking the signature of lamellar plagioclase with orthopyroxenes and olivine—practices from the sequence Barillas-III are very similar to the other ways of manufacturing pottery found at Barillas. Therefore, it is important to ask how this partial technical and aesthetic compatibility (fashioning, vessel shape, and tendency to add supports) relates to the differences recorded in paste preparation, firing, and decorative techniques. The end products of operational sequence Barillas-III were already classified as one macrofabric group, meaning that their clustering is evident even from a macroscopic perspective. A broader overview of the context of these finds will aid in explaining these data.

The operational sequence Barillas-III was exclusively excavated from stratigraphic unit UBI11B, which also yielded materials from Barillas-I, a sequence that mainly includes the *comales*. This stratigraphic coherence should be taken into account because it suggests an association between imported materials (Barillas-III) with a newly introduced vessel shape manufactured locally that might have entailed preparation of communal foods (Donner *et al.* 2019). Griddles are completely absent from all of the other contexts excavated at Barillas, and the lack of *molcajetes* and colanders contrasts with culinary practices at the other sites previously discussed.

Lithic technologies at Barillas continue with the local flake and sheet industry, mainly using chert, and production of Chontales cores, as well as scrapers. Sculpture is absent, and only one two-dimensional rock art fragment—a spiral petroglyph—was found on the surface, carved on a quarried piece of bedrock; therefore, its provenance is questionable. Obsidian was absent in all of the excavated contexts at Barillas, which is a clear departure from the immediately previous sites but could possibly suggest connections with Aguas Buenas and Alberto Obando. Absence of bifacial technology could be connected to divergences in foodways and other practices, but the total absence of faunal remains makes interpretations difficult.

Paleoenvironmental data is reduced to two samples that were tested through AMS for Carbon-13 (13C) signatures, which both yielded values (-13.6% and -14.7%) that can be associated to C4 or CAM plants. Microbotanical analysis of samples excavated at UBI1—*olla* fragment, *comales*, and plates—provided evidence for chili pepper, maize, and manioc consumption (Ciofalo *et al.* 2020). In particular, flat breads were possibly prepared with maize and manioc flour, or with a combination of both. *Tortilla*-like breads combining manioc and

maize flour are considered a delicacy within the research area by locals today (A. Villegas, pers. comm. 2015). Microbotanical studies point out that manioc and maize were also cooked in *ollas* with the addition of water (Ciofalo *et al.* 2020), so soups and stews might have also been part of the culinary practices at Barillas. Even though no faunal remains were retrieved during the excavations—which is possibly related to a conservation bias—a few zoomorphic representations were identified in the ceramics as supports depicting mammals and birds.

Stratigraphic analysis at Barillas suggests that, as in other sites before, flat areas surrounded by mounds were places mainly related to circulation and some practices related to food and beverage preparation and consumption. Mound use depended on location within the site; large structures surrounding flat open spaces were used for communal eating and drinking of non-daily products, such as flat breads cooked on griddles (Donner *et al.* 2019; Ciofalo *et al.* 2020), whereas mounds outside of the flat area configuration involved practices necessitating a higher number of ceramic vessels—possibly daily cooking—and unmounded areas within the open sections were mostly for circulation. Ceramic manufacture, lithic technologies, mound construction practices, and petroglyph carving are all itineraries present at Barillas and at different sites throughout the valley from cal 300 CE. Association to permanent water sources, wattle-and-daub buildings, and plaza configurations surrounded by mounds are traits present since cal 900 CE that continue through Barillas. However, a departure from immediately preceding practices is evinced by the absence of monumental stone sculpture and obsidian, as well as the minimal frequencies of ceramic materials from Pacific Nicaragua.[90] While these itineraries show certain discontinuity, other ones continue or are re-engaged with, evincing how continuity and discontinuity both play a role in the various intersecting trajectories of the valley.

90 Even though the presence or absence of certain raw materials and technologies—embodied in things—can be the result of sample bias, the methodological choice to excavate comparable contexts within the sites, specifically in regards to distance and position of the test pit in relation to mound configuration and topography, ensures that the interplay between presence and absence can be used as an analytical variable.

Digging as re-beginning

The interweaving of continuity and discontinuity of practices is clearly evinced at Rosa Dolores Oporta, where two architectural features are combined. First, data shows a "comeback" of a geometric spatial configuration, featuring a mound at the center and adaptations to the topography; second, located just a few meters away, a flat open area is surrounded by larger mounds, with high densities of surface materials. Also, the site was constructed at the foot of a curve on the Carca-Copelito stream, on top of the hill, but mainly sloping down towards another connected stream located 150 meters south. Mound construction practices involved regularly-sized low platforms that likely held wattle-and-daub structures arranged in a V-shape design on the slopes of a hill, with a mound at the top of the elevation. Apart from that, the open area was formed by three large mounds surrounding a flat terrain, where a vessel was purposely buried before this section of the site started to be used. Mound construction practices followed the traditional valley ways, in which quarried bedrock, river stones, sediment, and debris from ceramic and lithics were used as filling for structures surrounded by a ring of larger rocks. Excavations at RDO1 also evinced a hearth that was possibly used during the construction of the mound, so both excavation units at the site showed building practices on top of previously used areas, even if their use was during or immediately prior to the construction.

Regarding ceramic technologies, the ratio between unrestricted, restricted, and unidentified vessel shapes was 40.0%-32.0%-28.0%, which is divergent from Barillas but consistent with previous sites situated along the Carca stream (JOR2 and OP1). Also, the identification of Carca style rims within the RDO ceramic assemblage strengthens some continuous threads for these sites. Vessel shapes were also consistent with previous forms, but no colanders, *molcajetes*,[91] or *comales* were identified in the assemblage. Apart from that, ceramics at RDO are highly homogeneous in relation to all different manufacturing steps, clay procurement was local—except for possible imported fragments—and paste preparation was uncommon but might have involved sieving and tempering. Fashioning involved

91 One sample could be interpreted as such, but the sherd is too fragmentary to confirm *molcajetes* at RDO.

assembled elements between 1.0 and 2.6 cm, positioned equidistantly and in an oblique manner. Shaping was done through pinching and drawing, and finishing was done on wet clay, possibly with dried fingers or a tool. Leather hard clay smoothing and coating with slips (33.0%) comprised some of the surface treatment techniques, while decoration (21.0%) mostly involved incisions, appliqué, impressions, and appendages.

Lithic technologies at RDO continue with the local flake and sheet industry, mainly using chert as raw material. A very small fragment (<5.0 mm) of obsidian was found at RDO1, suggesting continuity with itineraries present at previous sites but absent at Barillas. Sculpture and petroglyphs were completely absent from the site and its surroundings, suggesting a possible change in rock art trajectories. The absence of bifacial technology could be related to shifting animal procurement practices (trapping vs. hunting, for example); but scarcity of faunal remains impeded exploring these ideas further. Changes in the procurement of other resources could also be related to the lack of bifacial technology.

Environmental data is only available from C13 signatures, which yielded values associated with C4 or CAM plants (-12.8%), as well as C3 plants (-25.6% and -24.8%). Faunal remains at RDO only consisted of deer tooth fragments found on a hearth feature related to the construction of mound RDOIV9. However, the tooth fragments did not show burn marks (Gill *et al.* 2019). As opposed to the excavations of flat open areas surrounded by mounds at Oporta, but consistent with similarly situated test pits at Barillas, Aguas Buenas, and Alberto Obando, faunal remains were absent within this architectural configuration at RDO. Also, it is important to mention that waste discard practices suggest a departure from previous trends, in which waste was burned and then deposited next to the mound.

Stratigraphy and material culture densities suggest that both sections of the site—the geometric area and the flat open area surrounded by mounds—were used with similar intensity, but the latter shows more trampling and therefore more circulation than the former. As such, it is possible that the open area was more related to communal practices than the lower platform mounds; however, fragmentation of the ceramic assemblage and a lack of further studies concerning lithics, microbotanical remains, together with a scarcity of zooarchaeological evidence, limit further insights. With the available evidence, it can confidently be stated that Rosa Dolores Oporta shows, as does Barillas, continuities and discontinuities in different itineraries. While mound construction, wattle-and-daub architecture, lithic technology, ceramic manufacture, and use of obsidian show clear connections with the rest of the valley, the practice of burying a vessel without human interments at the center of the flat open area was not identified at any of the other sites studied. Also, the absence of petroglyphs and stone sculpture, in combination with the construction of larger mounds within the open area, could indicate divergent paths regarding monumentality, which could be partly shared by Barillas. The return of geometric spatial configurations with a central mound—that does not necessarily evince the highest density of material culture at the site—also connects RDO with earlier ways of conceiving the landscape, especially the relationship between humans and the environment. As in the majority of the other sites excavated—except for the ones that show evidence of flooding events after the construction of mounds—the site was abandoned without traces of dramatic events. The volcanic activity in Pacific Nicaragua during the sixteenth century (Dennett 2016) and the European invasion could have played a part in the choice to abandon the site, but excavation data did not yield materials supporting these hypotheses.

8.2.4 MICROHISTORIES OF VIOLENCE, RESILIENCE, AND RESISTANCE (CAL 1650 - 1900 CE)

Even though evidence of human presence in the valley had previously been elusive (Gorin 1990; van Broekhoven 2002), two different excavated sites yielded confident radiocarbon dates between cal 1650 and 1900 CE: La Aventura (LA) and Sebastián Ríos Histórico (SRH). The latter was selected for excavation because it was the only site in the surveyed area that yielded surface colonial sherds, while the former was misinterpreted as a pre-Hispanic site due to its mounds and surface materials (ceramics, chipped stone, and a basalt column). La Aventura is located at the foot of the Güegüestepe hill, 100 meters east of the Mayales river and 500 meters east of the Cuapa road, which is used today not only to connect towns but also as part of a spiritual pilgrimage route. Mounds at the site featured construction techniques strongly related to pre-Hispanic ways of doing, such as the placement of a circle of rocks (quarried bedrock) filled afterwards with bedrock fragments, river stones, sediment, and material culture. However, technological choices regarding building techniques

did show differential traits when compared to pre-Hispanic traditions; for example, some mounds at LA featured larger rocks positioned vertically. Also, mounds varied in size, and even though a clear spatial arrangement was not visible beyond adaptation to the topography and enhanced visibility, a flat open area surrounded by mounds was identified (Arteaga 2017), and excavation results suggest daily practices, including living quarters within the site. Sizes of mounds suggest both communal and familial contexts.

Sebastián Ríos Histórico is an unmounded site located at the top of Loma San Gabino, which has excellent 360° parallel visibility of the valley, with views to the Lake Cocibolca volcanoes to the southwest, the Aguas Calientes hill to the West, and Cerro de la Cruz to the south; it also has easy access to a seasonal stream by descending the hill towards the east.

La Aventura was sampled for full ceramic analysis due to fragmentation and conservation issues related to the SRH ceramic assemblage. However, some insights into manufacturing practices were also identified for SRH, and they coincide—both technically and stylistically—with the sample analyzed at LA. The differences between the two sites seem to be connected to their use and function; while LA was inhabited by permanent residents (maybe one or various family groups), SRH consisted of a small household or camp (not necessarily permanent), or a place used during specific times (for example, during the days or during the night), possibly related to cattle-ranching or other agricultural practices. This is evinced by the absence of mounds, low material culture densities, and the reduced sizes of most of the vessels, which could indicate individual portions or dishes cooked and consumed by a small amount of people.

From a ceramic technology perspective, the most profound transformations—not only human—in the history of the valley took place with the invasion by Europeans. However, those changes do not appear to be as abrupt as form might suggest, as resilient and resistant strategies can also be interpreted from the microhistories of technical traditions. During pre-European times, the pottery manufacturing process suggests a subtle interplay between continuity and change for at least 1100 years (cal 300 - 1400 CE). Stable connections to the landscape (shared perceptions regarding raw material procurement, paste preparation, and firing practices) were combined with variability in the transmission of bodily gestures and tool kits (fashioning and finishing), aesthetic ideals (surface treatment), and foodways (vessel shape, which imply the incorporation of new products, storage, cooking, and eating practices). In contrast, ceramic technologies went through dramatic changes from the sixteenth century onwards, with transformations that not only suggest shifts in the social landscape, but also the incorporation of imported and likely imposed bodily gestures, tools, and culinary practices.

To begin with, clay procurement at the two sites dated between cal 1650 and 1900 CE—La Aventura and Sebastián Ríos Histórico—was reduced to a single main clay outcrop, with a clear preference for fine grained clays. Paste preparation practices were minimally represented in the assemblage and consisted of sieving and tempering related to the different functions of the end products, which consisted of cooking and storage vessels (operational sequence LA-IC). In this sense, there is a clear difference regarding landscape perceptions in pre-Hispanic times, where diverse clay outcrops were exploited simultaneously and did not subscribe to a 'least effort' model (Casale 2017). In contrast, the potters at La Aventura collected their clays from a single source located a few meters away from their dwellings. Instead of integrating several paste recipes into their kitchenware, they preferred to use their clay "as is" for most production, although sometimes they selected to sieve or temper when manufacturing cooking and storage vessels, which usually—though not exclusively—featured thick walls (10.0-12.0 mm). Since thicker, tempered walls aid in thermal distribution and shock resistance, as well as in evaporation and cooling processes, these paste preparation practices were interpreted as mostly functional.

This reduction in the variability of raw material sourcing localities and paste recipes might have several implications regarding the production group. To begin with, it may imply a homogenous manufacturing context, which could be due to cohesive social relationships—perhaps familiar, for example—but could also be the result of imposed ways of doing. Second, a less exploratory approach to landscape can be inferred, which could be related to several factors. First, increased security concerns are not difficult to imagine in such a tumultuous context and are also partially supported by settlement choices connected to high terrain with optimal visibility. Second, transformation of daily practices might have resulted in the restriction or abandonment of surveys throughout the valley aimed at obtaining resources, such as raw materials and food. Also, general changes in procurement relationships among communities might

have modified perceptions regarding clay outcrops as shared places of inter-community interaction (Donner *et al.* 2017). These inter-community relationships were possibly connected to the population decline within the valley, and this demographic decrease can be directly linked to the homogenization and loss of variability in clay procurement and preparation: when exposed to less producers that do things in a different way, there is a greater tendency to standardize. Finally, shifts in the organization of production might have also affected technical choices.

Even though clay procurement and preparation practices dramatically shifted, this is not surprising, since they have been classified as some of the most malleable steps of the operational sequence (Gosselain & Livingstone Smith 2005). In contrast, fashioning techniques, defined as some of the steps of the manufacturing process less prone to change, display a huge investment in resilience and resistance. Potters at La Aventura and Sebastián Ríos Histórico refused to transform all their socially learnt bodily gestures connected to the pre-forming of vessels. The potter's wheel was unanimously rejected,[92] and even though rotary non-kinetic energy and molding were partially adopted, they are minimally represented in the sample analyzed, consisting of only a handful of sherds. Therefore, the coiling technique, which implies the separation of a clay mass into assembled elements for shaping a vessel, together with bodily gestures of rolling, positioning, pinching, and drawing, show a continuity that resisted the impact of the colonizer.

Just as coiling (0.8-2.0 cm) was combined with new ways of making, such as the use of a mold and a passive support for non-kinetic rotary energy, finishing techniques also showed a small degree of variability. Both leather hard clay and wet clay gestures were identified in the sample analyzed, and maybe the most remarkable technique is the one that involved the possible use of a corn cob or straw for both fashioning and finishing purposes. Even though brushing was already identified at JOR and RDO, it was only minimally present; in contrast, it is a recurrent trace at LA.

Homogeneity in surface treatment resulted in matching external appearances of vessels. The virtual absence of chromatic decorative techniques, such as coating with slips, might relate to restrictive political and ideological circumstances that did not favor colorful decorations. The only decoration present, represented by digital pinching marks on the external vessel walls or on reinforcements, might indicate a vague stylistic connection with a pre-Hispanic tradition, defined in this manuscript as the Carca style. Transformations in firing technology resulted in the use of open hearths with little control of temperature, exposure, and duration of the firing. However, end products were fired following the necessary standards for manufacturing durable earthenware, as evinced by the good preservation status of the sherds.

Finally, kitchenware is characterized by dominant unrestricted shapes; however, both jars of various forms and *ollas* (restricted) share similar morphometric characteristics, with diameters of minimally 5.0 cm and never exceeding 30.0 cm, with walls between 5.0 and 12.0 mm wide. In contrast, plates (both cooking and serving ones) featured diameters between 25.0 and 45.0 cm, in combination with walls 7.0-9.0 mm wide. This trend was also present at Sebastán Ríos Histórico, where diameters of all vessels tended towards smaller sizes, as mentioned above, but griddles still yielded measurements up to 40.0 cm. Even though *comales* were excavated in pre-Hispanic archaeological contexts within the study area at UBI1 (Donner *et al.* 2019), their ubiquity at both LA and SRH implies a profound transformation in foodways, with a marked preference of flat breads, possibly *tortilla*-like foods. In fact, excavation unit LA3 yielded one of the few excavated samples of a defined grinding stone tool, a *mano*. The remarkable increase in the frequency of griddles—from less than 5% in pre-Hispanic Barillas to 14% at LA1—evinces that the incorporation of Post-classic Mesoamerican practices (the *comales* and *tortilla* food kit) did not (only?) happen during pre-European times as was previously believed but apparently was a by-product of European invasion and colonization.

Transformation of foodways is not only shown by shifts in ceramic vessel shapes and a possible increase of the importance of maize agriculture—probably connected to the use of corn cobs as tools in ceramic manufacture and to the preference of *tortilla*-like dishes—but also by butchery and cooking practices studied through the zooarchaeological remains excavated at SRH and LA (Gill *et al.* 2019). Narratives of resilience and resistance are supported by the consumption of both native and European introduced species, which involved butchery practices with both metal and stone tools (axes and chert blades), as well as continuity in the consumption

92 Only one sherd with signs of having been wheel-thrown was excavated from superficial levels at the site of Sebastián Ríos Histórico.

of slider turtles. However, exploitation of European domesticates points out to well-defined transformations in human-animal relationships. Hunting was at least partially replaced by keeping livestock next to households, which ensured a consistent meat supply. Finally, animal-based food diversity decreased, since small mammals—which comprised over 50% of the pre-Hispanic foodways in different ratios depending on spatiotemporal context—were notably lacking.

Living in the valley during these times was apparently isolated, lonely, and possibly dangerous. Both settlements feature elevated terrain with excellent visibility, and data points to human-environmental interactions in more circumscribed spaces when compared with pre-colonial times. The contemporary town of Juigalpa was already in existence, so it is possible that changes in landscape and environmental entanglements were related to a new hierarchized settlement pattern, together with the establishment of a new road network. Juigalpa, the regional center, might have been an assiduous destination for dwellers in the valley, who probably gathered there periodically (weekly, monthly, seasonally) for supplies from the market, socialization at the park, health care, legal and religious matters, feasting, etc. Even though the valley was slowly re-populated in the 19th and 20th centuries, these new ways of living and organizing were transmitted and reproduced by the newcomers, who continued with certain practices and transformed others.

8.2.5 THE SOLITUDE OF A SEEMINGLY DISCONNECTED PRESENT (CAL 1900 CE - TODAY)

Maybe one of the most relevant aspects of understanding ceramic manufacturing practices today in the valley of Juigalpa is that this delicate interplay of intertwining stability and change is a continuous thread in its history. Microtechnical traditions of ceramic production today and in the past are embodiments of several itineraries, pre- and post-Hispanic, that interweaved together. Even though narratives of resilience and resistance are still possible thanks, for example, to the rejection of the potter's wheel, the coiling technique has been largely abandoned in favor of working on a clay mass using a convex mold. In the time spanning the lives of the dwellers of La Aventura and Sebastián Ríos Histórico and the experiences of current-day potters, new bodily gestures involving percussion and beating have replaced pinching and drawing. Perhaps as a metaphor for the incorporated hierarchical order, gestures from up to down replaced bottom-up ones. Clay procurement practices continued to transect itineraries of exploitation of a single source, paired with little to no paste preparation practices. Finishing continued to be done mostly on wet clay, with a corn cob and more recently with a plastic tool. Surface treatment involves, such as at LA and SRH, burnishing with a hard tool, either a *zapoyol* seed or a river stone (chert). Shapes produced are varied, but *comales*, jars, and *ollas* continue to dominate. Firing is usually conducted in a kiln (specialized potters), but also in open hearths or even on the kitchen fire (non-specialized potters). Distribution of pottery—such as other products coming from the valley—is centralized in the Juigalpa and other town markets; the potters of the Güegüestepe village live such precarious lives that when the PACEN team returned to the community in 2016 to conduct more interviews, most of the families had emigrated to Juigalpa in search of more sustainable jobs. Therefore, it appears that the thread of ceramic manufacture is about to be cut in the valley. However, even though ceramic and tile production are activities that have been almost completely abandoned, bricks are still produced and represent a sustainable alternative that still involves working with clay. However, this practice requires building an expensive massive kiln, as well as ready access to water and fuel, which is prohibitive for most local families. Subsistence, then, relies on cattle, agriculture, production of edible products or collection of resources to sell at the Juigalpa market, as well as wage labor. Houses are still constructed following the traditional manner (Llaudet 2019) and domestic compounds integrate a larger house (normally occupied by the head of the family) with smaller structures, usually where younger generations sleep. If the kitchen is located in the larger house, all members—regardless of where they sleep—tend to eat and spend their free time there. If the kitchen is constructed as a separate building, then daily life mostly happens around it. Agriculture and pasture practices are integrated into domestic life. Poverty and a lack of education and opportunities are also part of it; illiteracy rates among the dwellers of the valley are still very high in spite of the thorough literacy campaigns organized by the revolutionary government over the last 40 years.

Continuity in human-environment entanglements is not only evinced by the resilience of traditional pottery manufacture, but also by other practices, such as construction with local materials, hunting, fishing, gathering, agriculture, and foodways, just to name

some examples. Locals showed a deep understanding of the valley landscape, but this knowledge was rarely extended to the Amerrisque mountains or south beyond Juigalpa. Their insights into soils, land, animals, plants, seasonal cycles, climate, and winds were fundamental for the development of this research. Therefore, rural communities in central Nicaragua might have transformed the way they engage with their landscape, but their relative isolation and marginalization from cities has proved to be both a blessing and a curse. On the one hand, it has confined them to poverty, limited access to education, and social stagnation; on the other hand, it has provided them with the privilege to understand how the destruction and conservation of our environment has the potential to destroy all our ways of living, even for those of us who usually live our lives as if we were detached from nature, as if we were not part of its bundle of unfolding materialities.

8.3 SHAKING WHAT WAS TAKEN FOR GRANTED

The redefinition of the chronology of central Nicaragua started with a very simple point of departure, which first and foremost accepted that any attempt to characterize the history of ceramics of such a large area as the modern department of Chontales, or between the *cordillera* and the lake, was indeed too broad. Consequently, a Braudelian approach was followed, in which the valley of Juigalpa was the protagonist, together with the people who have dwelled there, understood always in their relationships with the environment. Therefore, the histories told in section 8.2 of this chapter are microregional and should not be extrapolated to the whole region. Even though Gorin and Rigat surveyed a comparable area, the scope of this book is dramatically different in scale, space, and therefore time. Giving up certain types of generalizations also provided the freedom to explore the experiences of these groups of potters and to be able to tell parts of their forgotten and erased histories. At the same time, a microregional approach does not stumble in the presence of "gaps", as an absence of human technological evidence during specific intervals is commonly interpreted.

In a way, the definition of the Mayales I and Mayales II periods in Gorin's (1990) chronology was rooted in this macroregional goal, which was forced to match the chronology of Pacific Nicaragua. Therefore, both phases should be discarded for several reasons. First, they lack reliable radiocarbon dating. Second, the only excavated context from which they were recovered is La Pachona, located a few kilometers south of the research area. Two other sites were included in these phases: Los Andes and the agricultural school near Juigalpa. While the latter was not visited, a systematic survey at Cerro Los Andes, as well as over nine square kilometers around La Pachona, was conducted for this research. The mounds surrounding and constituting La Pachona were so different that recording architectural structures was very complicated when trying to use the forms developed for the valley (A. Arteaga, pers. comm. 2015). The survey at Los Andes also yielded very different traits regarding material culture; even though piles of rocks as a mound type are very common throughout the valley and are associated with sites of different temporalities (Arteaga 2017), those identified at Los Andes were unique, featuring a large circular stone as a lid. Other mound morphologies were also unique, and agricultural terraces were also identified—the only ones recorded for the whole research area. For these reasons, together with the presence of surface materials mostly dated between cal 900 and 1250 CE, these two areas were left outside of the scope of this study. Additionally, recent excavations at La Pachona indicate later dates. Four assays yielded dates between cal 1000 and 1160 CE, one between cal 1446 and 1528 CE (R. Vlaskamp, pers. comm. 2017), and the only early one—cal 195-42 BCE (R. Vlaskamp, pers. comm. 2017)—is problematic because it was found a few centimeters above bedrock and it is associated to later ceramics.[93] Therefore, even though it is of course more than possible that human groups dwelled around La Pachona, at Los Andes, and on the Juigalpa plateau between BCE 500 and 300 CE, evidence is not solid enough to support this assertion at this time, especially not for the valley.

The Cuisala phase, as defined by Gorin (1990), spanned from 400 to 800 CE largely coincides with my "Geometric Worlds". Main differences reside in the inclusion of obsidian and arrow points in the

93 I conducted a general inspection of the assemblage from Unit 3 of the off-mound trench excavated by Roosmarie Vlaskamp and her team at La Pachona in 2015. Even though the profile of the trench evinced a "gap" as reported by Gorin (1990), the presence of sherds and *malacate* fragments below this possible hiatus that were usually found in more superficial stratigraphic units contest the interpretation of an earlier phase followed by abandonment and re-occupation. Additionally, a posthole was identified in the excavation unit, so stratigraphy may have been disturbed.

lithic repertoire, which this research has placed from cal 900 CE on instead. Also, Gorin only establishes connections with Greater Nicoya and Costa Rica—both Pacific and Caribbean coasts, while the dataset in this book demonstrates that long-standing relationships with northern Nicaragua and Honduras were also in place. Ceramic analysis east of the research area, near the Caribbean watershed, also suggests ties with central Nicaragua (Miranda Tapia 2014), a connection that should be further explored.

However, one of the most important differences between Cuisala and Geometric Worlds is the identification of monumentality and social complexity without specific evidence pointing towards hierarchical social structures. According to Gorin, communities were small with no observable spatial arrangement (but see El Tamarindo) and characterized by low social complexity (Gorin 1990). Since the author includes the sites of Tamarindo, El Cóbano, and Aguas Buenas, "temporal" views are convergent in spite of divergent epistemological paradigms. However, monumentality at AB embodies the materialization of a long tradition of earth and stone moving, mound construction, clay manipulation for architectural purposes, ceramic and lithic manufacturing, and consumption practices. These rooted traditions were constrained to household compounds like AO, which were stages for habitual, ritual, and strategic practices (Pauketat 2001). The action of constructing Aguas Buenas, however, shows spatial regularities, a geometric integration that reveals a common plan, an intended consequence to build something completely different, which would restructure practices and future actions. In this sense, it is pertinent to separate the act of mound building from the activities that took place on the mounds (Joyce 2004; Sassaman 2005).

As stated above, Aguas Buenas shows no evidence of permanent residence. Also, no human interments were found during either on- or off-mound excavations; therefore, it likely had no intended funerary function either. In contrast to early architecture projects in Mesoamerica, in which monumentality was an unintended consequence of functional solutions (Joyce 2004) in Aguas Buenas the project itself seems to represent the intended consequence. Therefore, the action of building Aguas Buenas restructured mound building, which was part of the material world at the time, creating a previously type of unknown and permanent landmark. Therefore, Aguas Buenas, as a monument today and in the past, is a site of intended and unintended memory work, the material consequence of both practices and experiences (Pauketat 2014). In that sense, the results of the PACEN research project as a whole argue that the site was probably a place for periodic reunion since even before its monumental erection, and the practices that gathered people and communities in Aguas Buenas were malleable and thus constantly negotiated and transformed. This view qualitatively departs from the assessment made by Gorin. The monumentality of Aguas Buenas contrasts with the traditional disciplinary views of the archaeology of southern Central America, in which monumentality is seen as a synonym of inequality. Instead, life in the valley of Juigalpa during what has been known as the Cuisala phase was characterized by non-hierarchical yet complex communities, who periodically moved in and out of the valley, while a smaller portion resided within it, probably choosing locations near Aguas Buenas. Even though these communities shared technological and aesthetic perceptions, they also had their own individual signatures, and they all joined together in a large inter-communal building effort to construct Aguas Buenas (Casale 2017).

For the Potrero phase (800 - 1200 CE), there is a temporal mismatch between Gorin (1990) and the chronological proposal included in this manuscript, which may be linked to issues in incorporating "gaps" in meta-narratives that try to connect different regions, in this case central to Pacific Nicaragua. Since 800 CE was traditionally regarded as an extremely important date that marked the arrival of foreign groups (McCafferty & Dennett 2013), a new phase was inferred that would specifically signal an increase in ceramic types imported from Greater Nicoya and the appearance of *malacates*. However, the radiocarbon assays analyzed in this book determined that sites featuring an important increase in those types of ceramics are actually situated between cal 900 and 1250 CE, in what is defined in these pages as "Water Worlds". During this time, human agency throughout the valley kept on with leaving traces that are still observable today. Aguas Buenas continued to be expanded and used, but material evidence suggests practices that depart from the previous ones, which were more concentrated around mound construction. In contrast, Aguas Buenas was now a place to build and to stay in for longer periods of time, enough to prepare, consume, and store food and supplies. The social landscape of the valley became increasingly complex; this does not mean that the previous sites lack complexity but implies that variability in manner of dwelling, as well as membership in different

communities, constellations, and networks of practices, is more evident now, possibly thanks to increases in population and site numbers.

Chronological markers for sites in the valley between cal 900 and 1250 CE are the first evidences for wattle-and-daub architecture, bifacial lithic technology combined with the traditional flake industry, butchering of animals, the use of obsidian, monumental sculpture, architectural configurations in the form of flat open areas surrounded by mounds, and the presence of the traditional vessel shapes for the valley in combination with colanders and *molcajetes*, which were previously unknown. Also, human interments were found within the valley on an off-mound context at Roberto Amador (I. Torreggiani, pers. comm. 2019) as well as on- and off-mound excavations at La Pachona (Gorin 1990; Hartog 2017). Differential excavation strategies might have contributed to the sample bias, so it is also possible that human remains were deposited in and away from mounds at other excavated sites. Apart from that, traces of waste discarding may be connected to households. The consumption of mammals dominated the protein-based diet, and sites feature differential ratios of the diversity of species consumed. This could entail either divergent hierarchies or approaches to foodways, since all faunal remains should have been readily available for anyone with sufficient skill to hunt or trap them. Even though fishing in the area is possible today at streams and rivers during the rainy season and therefore was available as well during ancient times, fish remains are minimally represented within the archaeological faunal remains. This could be connected to specific procurement and consumption practices. For example, there is the possibility of a preference for lake species that were directly consumed at the shores of the lake. These trips might have implied navigation down the lake, but canoe transportation is unlikely back up to the valley.[94] Therefore, the way back from the lake to the valley was possibly transited on foot. Probably, both raw materials and finished products (such as ceramic polychromes, for example) were traded across the lake, so walking back up to the valley would have been habitual act. Special fish species found in mortuary contexts clearly evince a lake connection (Gill *et al.* 2019), knowledge of these species, and specific links to human interments. Thus, data suggest that even though the people of the valley were familiar with fish and lived near rivers, streams, and a lake that could easily provide them with sufficient protein in their diet, they preferred the consumption of mammals. It seems that one of the ironies in these "Water Worlds" is the preference for terrestrial animals above aquatic ones.

The definition of the Monotá (1200 - 1550 CE) and Cuapa (1400 - 1600 CE) phases was connected—even if indirectly—to the "types are people" premise, since it is based on the supposed appearance of different lithic and ceramic types. For example, the site Barillas was characterized by Gorin (1990) and Rigat (1992) as one of the ten sites defined for the Cuapa (1400 - 1600 CE) phase. The last pre-conquest occupation in Chontales, Cuapa features homogeneous decorated and undecorated ceramics that share a very low-quality paste and completely differ from all previous phases. According to Gorin (1990), the poor paste quality is the result of low temperature firing, which also played a role in conservation. Also, when compared with previous phases, Gorin and Rigat (Gorin & Rigat 1987; 1988; González Rivas *et al.* 1990; Gorin 1992; Rigat 1992; Rigat & Gorin 1993; Espinoza Pérez & Rigat 1994) established that sites during the Cuapa phase were larger in size (47-300 mounds, up to 6.5 ha) and show clear spatial arrangements, including plazas and aligned platforms. Denticulated flakes, hammers, arrow points, *manos* and *metates* characterize lithic production during this phase, with a main flake industry comparable to preceding phases. Also, Rigat (1992) identified what he considered a chronological marker for Cuapa: the Cuapa scraper, a multifunctional tool shaped like an orange segment.

The radical differences found in the ceramics, together with the minimal presence of Greater Nicoya ceramics, led Gorin (1990) to propose the arrival of an external group that re-occupied abandoned Monotá (1200 - 1550 CE) sites and started new settlements in a progressive manner. These immigrants were well-organized and numerous; for Rigat and Gorin (1993), they probably took advantage of the consequences of the Spanish conquest, which left the local Nicarao of Chontales in a crisis after their connections to the Pacific coastal regions were severed. According to Gorin, the Cuapa phase practitioners were the *chondales* described by Oviedo: the foreigners in the eyes of the Nicarao eyes. Even though Gorin proposed that the newcomers might have been Matagalpa speakers, later work conducted by Espinoza Pérez and Rigat (1994) found no connections between this group's material assemblages in the Northern Highlands with the Cuapa materials from Chontales.

94 During the rainy season, however, it is indeed possible to navigate back up through the Mayales river (A. Geurds, pers. comm. 2019).

Lab No	Lab	Site	Region	Excavation Unit	Depth (cm)	Material	14C Dates BP
GIF-7228	Gif sur Yvette	La Pachona	Chontales	SS1	1-10	charcoal	430 ±60
GIF-6894	Gif sur Yvette	El Cobano	Chontales	SS1	10-20	charcoal	1160 ±60
GIF-6896	Gif sur Yvette	El Cobano	Chontales	SS2	60-70	charcoal	1290 ±70
GIF-7226	Gif sur Yvette	El Cobano	Chontales	SS2	100-110	charcoal	1200 ±60
GIF-6895	Gif sur Yvette	El Cobano	Chontales	SS1	40-50	charcoal	1030 ±60
GIF-6893	Gif sur Yvette	El Tamarindo	Chontales	SS2	10-20/20-30	charcoal	1510 ±60
GIF-7229	Gif sur Yvette	La Pachona	Chontales	SS1	50-60	charcoal	1100 ±60
GIF-7230	Gif sur Yvette	La Pachona	Chontales	SS1	70-80	charcoal	750 ±60

Table 24: Raw data of the radiocarbon assays examined by Gorin (1990, 259).

Recently, Geurds (2013b) analyzed the arguments surrounding this Cuapa complex, especially critiquing Gorin and Rigat's arguments for their definition of it as a stand-alone phase. Geurds challenged the foundations of the Chontales chronology, which was mainly based on the polychrome ceramic cross-dating that more recent radiocarbon results (McCafferty & Steinbrenner 2005a) have proved inaccurate (Geurds 2013b). The materials that aided in the proposal of the Cuapa dates (1400 - 1600 CE) have now been positively dated to 1000 - 1350 CE, earlier than previously believed. Moreover, Geurds re-examined the stratigraphic excavations conducted by Gorin and determined that data resolution and quality were insufficient for establishing the chronological position of Cuapa (Geurds 2013b). His suspicions proved to be accurate, and the first radiocarbon dates from a site previously characterized as Cuapa, Barillas, yielded dates of cal 1255 - 1391 CE (Donner & Geurds 2018). Apart from that, absolute dates associated with the Cuapa scraper actually place its occurrence even earlier than Barillas, in sites like Josefa Ocón Robleto (cal 995-1150 CE) and Oporta (cal 1020 - 1190 CE), and even Alberto Obando (cal 300 CE) (Donner & Geurds 2018; 2019).[95] In this sense, the basis for Gorin and Rigat's claims of the arrival of a completely new group and the start of a new phase was unreliable. Differences in site design and size should also be re-evaluated with this newly available dataset (Arteaga 2017; Donner *et al.* 2018). Therefore, the Cuapa phase in Chontales chronology urgently needs to be re-examined and possibly discarded. The Miragua común type, which was established as a Cuapa diagnostic, can be identified as vessels made with a similar paste to the one used to make *comales* at Barillas. However, griddles at Barillas were of local manufacture, as the analysis of the techniques involved in their production showed. In turn, the presence of the Cuapa scraper cannot be exclusively associated to this phase anymore, since its occurrence is earlier. The current dataset establishes that between cal 1255 and 1390 CE, the people who lived at Barillas continued with local traditions of lithic and ceramic manufacture, as well as mound building practices, using their own technical and stylistic signatures. As a result, there is enough evidence now to discard the arrival of a new group as an explanation for changes that apparently took place in different rhythms and intensities than previously outlined.

The raw radiocarbon data from the eight samples retrieved by Gorin (1990, 259) (**table 24**) were recalibrated using the same software packages

95 Identification of the Cuapa scraper was done by S. Jiménez Castillo and João Carlos Moreno de Sousa.

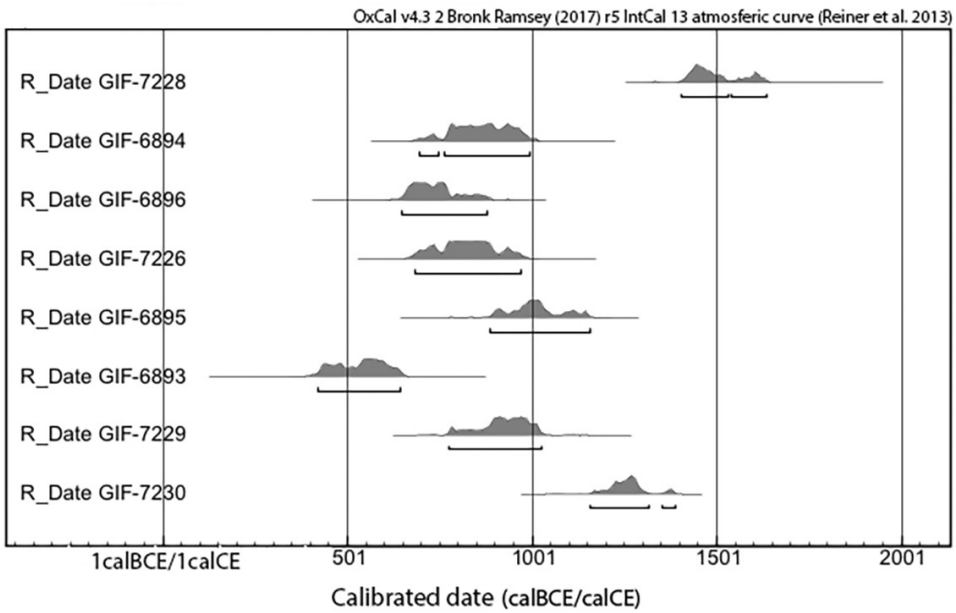

Figure 227: Multiplot showing the dates retrieved by Gorin (1990, 259), recalibrated with OxCal v4.3.2.

applied for the samples analyzed in this book (Donner & Geurds 2020). Results (**figure 227**) point out to coherence and not discrepancies between the two researches, with Gorin's dates showing a general span from cal 423 to 1635 CE. La Pachona ranges from cal 775 to 1635 CE, which coincides with the preliminary assessment made for its ceramics, together with the dates obtained by Vlaskamp. El Cóbano yielded dates between cal 648 and 1157 CE, so it could be partially contemporaneous with the construction of the *Outer Arches* of Aguas Buenas and with Water Worlds. Finally, El Tamarindo provided a date between cal 775 and 1025 CE.

8.4 THOUGHTS REGARDING AMS DATING IN CENTRAL NICARAGUA

Since this book was designed to answer questions regarding time, it allowed me to experiment with different types of datable materials to test accuracy and, as a result, propose effective strategies for future inquiries within and beyond the research area. Five different types of materials were submitted to different labs for AMS dating: organic sediment, charcoal fragments, and ceramic sherds featuring charred encrustations in their inner surfaces, as well as animal bone sampled by an archaeozoologist and charred seeds sampled by an archaeobotanist. In all cases, stratigraphic analysis of each excavation unit preceded sampling.

The most accurate results were obtained through organic sediment samples and sherds featuring charred remains. Even though 36.0% of the charcoal fragments matched the results achieved through organic sediment dating, this was only the case with deposits deeper than 40.0 cm below surface and at least 20.0 cm above bedrock. Since the only charred seed sampled for dating was retrieved on a superficial level (10.0-20.0 cm below surface), it is recommendable to date deeper samples. Regarding animal bone fragments, collagen on pre-colonial context samples was deemed insufficient by lab technicians, so only post-contact samples were successfully dated. This conservation issue regarding faunal remains could partially strengthen the idea that their absence before cal 900 CE within the valley might reflect post-depositional processes and not ancient human practices.

8.5 FUTURE RESEARCH: ITINERARIES IN CONTEXT

Research in the valley of Juigalpa has questioned the relationships between different types of monumentality, such as architectural or sculptural, with hierarchies and social complexity. The communities that dwelled in the valley engaged in shared monumental architectural and rock carving projects as far back as cal 300 CE and were part of a constellation of practices related to monumental stone sculpture from at least cal 900 CE. Even though their technologies and consumption practices do not necessarily show social inequalities in the traditional sense, each community identified itself by divergent practices that made them unique. In the context of a valley where all resources were readily available, where control of these resources does not seem to have been asymmetric, divergencies in practices seem to be connected to participation in different communities, constellations, and networks of practices.

From a ceramic technology point of view, different communities engaged with the valley, but they all shared certain standards regarding clay procurement and preparation practices, as well as fashioning, finishing, surface treatment, decoration, and vessel shape. The bulk of variability is indeed found in the most malleable steps of the operational sequence, surface treatment and decoration. The rest of the manufacturing process remained more or less stable, especially those steps related to habitual embodied practices, learned through observation and supervision within a social group. Therefore, narratives of migration waves and population displacements do not represent the complexity of the intersecting flows of the people of the valley. These communities were continuously in contact with other communities, who possibly lived in the surrounding environments, such as the Cordillera Amerrisque and the lakeshore. Evidence of contact with the north, including parts of present-day Honduras, as well as with the Managua Department and wider Pacific Nicaragua, are evident.

Through history, relationships between "the people of the valley" and the valley underwent several transformations. These changes were both enabled and constricted by shifting socio-environmental conditions within the valley, as well as beyond it. The study of the different itineraries of traces of human practices show that chronologies cannot be built reducing the complexity and richness of human experience to one single thread. Future research in the valley should expand along the following itineraries: first, a comprehensive dating project of Aguas Buenas is urgent for understanding human-valley entanglements over time. A coring campaign encompassing all of the architectural arrangements proposed by Auzina (2018), with the goal of obtaining organic sediment samples would be a good start. Technological ceramic analysis of these divergent contexts, paired with an overview of lithic technologies, rock art, paleoenvironmental data, and residue analysis, should be taken into account. Second, materials excavated at other contexts between cal 300 and 1250 CE should be thoroughly analyzed before engaging in more excavation projects. Technological analysis of these assemblages will clarify many of the questions regarding these sites, the changing role of Aguas Buenas, population shifts, and continuities and discontinuities in material repertoires. Finally, these microscale projects should be emulated in other regions of the country in order to create comparable datasets that can shed light on the actual lives of ancient communities throughout parts of Nicaragua.

Theoretically and methodologically speaking, this exercise in chronology building could be expanded with more research focused on the *longue durée*, which could be achieved through a transdisciplinary endeavour integrating paleoenvironmental and pre-ceramic data. A deeper history of the valley, for example, could shed light into various itineraries present in the history of the people of the valley. The integration of other datasets, such as human remains, could also aid in these narratives. Also, the expansion of the research area beyond the valley, including the Cordillera Amerrisque and the lakeshore, could enlighten how these three units intertwined in the past and in the present. Also, geochemical characterization of material culture, in combination with the expansion of geochemical reference collections throughout the country, could help situate the research area within a broader context.

8.6 CONCLUDING REMARKS

The history of the relations between humans and the valley of Juigalpa was conceived in these pages as the intersecting itineraries of interweaving traces of practices. Through a non-geometric paradigm of time, the intervals established by the probabilistic interpretation of AMS dating were organized in bundles of unfolding traces, which were always

narrated trying to encompass at least some fraction of the practitioner's perspective, but also the palimpsestic ontology of materiality. Five different bundles were outlined, which historicize the changing relationships between human communities and the valley from at least cal 300 CE through to the present. In this narrative, ceramics is one thread—itself made up of various smaller threads—that was only analyzed in relationship to other interweaving threads.

This book granted me the opportunity to undertake—together with a heterogenous and numerous group of people—a journey into the microhistories of the valley of Juigalpa. The depth and high-grain resolution achieved in this study of the different trajectories of practices provided me with a powerful and unique tool to discuss and conceptualize a chronological discourse.

Chronologies are not—and therefore should not be conceived as—the histories of ceramic types or modes. This research has proven that, for example, the high variability in ceramic decoration techniques—which is always constrained within certain universes of possibilities—is contrasted with very stable trends regarding all other steps of the operational sequence of ceramic manufacture, especially the steps involving specific bodily gestures, which are learned in a situated context, in a time and a place. Additionally, decoration and vessel shape, which were the basis of the previous chronology, may even vary among potters who shared the valley during the same time scale but experienced it in divergent itineraries. The study of ceramic technologies entails a lot more than the history of local pottery. The interplay between stable and variable steps within the manufacturing sequence, when seen in their intersection with other itineraries (building practices, stone industries, foodways), sheds a unique light on the life experienced by different peoples. Therefore, lithic artifacts—considered unsuitable for chronology building by Rigat, because their transformation rhythms are too slow to be of any use (Rigat 1992)—should not be discarded from chronological studies. Mound construction practices can look deceivingly continuous and unaltered, but mounds can be either an end product themselves or conceived as foundations for something else. They can also be thought of as tombs, and even when they are used by living people, different traces—such as differential artifact frequency, shape, or location-—can indicate divergent itineraries that in turn will intersect with stone tools and ceramics. Apart from the fact that pots are not people, pots are also not just pots, an arrow point is not just a bifacial lithic tool, a mound is not just a mound, and a starch grain of maize is not just maize. These are conceptualizations rooted in a Western scientific archaeological tradition. In contrast, the traces of these things unfold, become, and bundle in many ways, and a chronology builder must carefully choose these bundles.

The results of this research have provided an updated chronological narrative of the valley of Juigalpa that is both different and similar to the previous attempt. It included the first systematic, complete coverage, intensive survey in the country, as well as stratigraphically controlled excavations in a multiplicity of contexts. Ceramic analysis was conducted with a technological perspective incorporating thin section petrography and macrotrace examination, a combination of techniques that has never been applied before in southern Central America. My work was immensely enriched by results from other colleagues, who studied lithic technologies, foodways, faunal remains through a practice theory approach, rock art, and the people who live in the valley today, just to name a few. Also, this research was enhanced and many times even re-directed by local individuals, whose profound knowledge of their environment and the many cycles of the valley served as a baseline for all the scientifically legitimated studies mentioned above. Beyond the contributions in fieldwork and laboratory methodologies and techniques, I think the most important outcome of this research is theoretical and ethical. As a discipline, it is urgent to move away from our ruling chronological paradigm and our geometric organization of time. The present is a palimpsest; there is no divide between the present and the past. The line is paradigmatic and only estranges modern local populations from a rich history that was immensely and violently impacted by the colonial invasion and regime. History does not stop; the valley and its dwellers continue to unfold.

To understand the histories of the different communities that lived and experienced the valley of Juigalpa—-and beyond it—in the past and the present, we need more than an ability to identify ceramic types. This study of interweaving practices shows that culture areas are fallacies, that boundaries between indigenous and exogenous can be deceiving. The histories of embodied practices are histories of continuity and change, but also of

power struggles inscribed in bodies and therefore in things. A technological approach to the ceramics of other regions throughout the country, especially the Caribbean watershed, the north, the Pacific coast, and the Managua region, would enrich this first time-lapse that was composed for the valley of Juigalpa. And even though I know this task might seem overwhelming, it is completely feasible if we succeed at establishing collaborative research agendas with specific research questions. These inquiries should start by addressing both the local microtechnical histories and communities of potters, but also their participation in different constellations and networks of practices. A bigger picture of these intersecting bundles through time and place will allow us to paint a much more creative and life-like portrait of ancient Nicaragua, especially one that is not constrained by delineating cultural areas but is a complex mesh of overlapping, intersecting, unfolding, and becoming trajectories that make life vital and vibrant.

Acknowledgements

Writing these pages was a journey that involved moving from Panama City to Leiden and then crossing the ocean three or four times a year to conduct fieldwork and labwork seasons in Nicaragua, as well as attending conferences and visiting family in other countries on this side and the other side of the "pond". It is quite ironic that time and space weaved the fabric of this adventure, with long flights, cultural diversity, jetlags, stomach flus, and catching colds due to the climate changes. And even though a lot of these trajectories were done solo, this itinerary bundled different trajectories, it was a group journey, a team experience.

My arrival in The Netherlands was one of the smoothest welcomes in my life thanks to my colleague Roosmarie Vlaskamp, who warmly received me at Schipol airport after a very tiring flight. Roos, your hospitality and introduction to the Dutch culture, its health care system, and its bicycling rules enormously helped me in the process of making Leiden my cozy home. The welcome party did not stop there, and the same night of my arrival, our supervisor Dr. Alexander Geurds kindly invited us over for dinner. Our interactions had actually started through Skype and then continued in a very hasty trip I did to Nicaragua before officially joining his team, but they then built up at the Faculty of Archaeology, especially during fieldwork. Even though I am not necessarily a spiritual person, I dare to say that I was blessed with a supervisor like you, Alex. The delicate combination of patience, trust, and communication provided me with both the wings and the anchor I needed to conduct this research. Your mentorship was essential for the development of this text and is a model for how I supervise students now. You are a generous soul, and I am happy to have grown as an archaeologist and as a person beside you.

I would like to thank my promotor, Prof. Corinne Hoffman, who supported me through all this process, especially clarifying some mazes of ceramic technological analysis. I am also grateful to Prof. Rosemary Joyce and Dr. Russell Sheptak; our theoretical debates and sherd sessions were extremely invigorating and fun. Gracias Prof. Annick Danneels for your continued guidance for more than a decade. Special thanks to Dr. Sébastien Manem, Prof. Valentine Roux, and Dr. Patrick Quinn, who generously trained me in the techniques required for technological analysis of ceramics. I am also grateful to Prof. Patrick Degryse for his help with archaeometric techniques and his interest in my research.

Working at the Faculty of Archaeology at Leiden University was one of the most enriching experiences I have ever had. The multiplicity of lines of research, the diversity among colleagues, the top-of-the-line laboratory facilities, and the fantastic staff members allowed me not only to develop my project, but also to find long lasting friendships. My two paranymphs, Katarina and Sony, made sure I had the time of my life with Caribbean style in these cold plains. Mariana, Eduardo, Jana, María, Gabriel, Jaime, Arelis, Andy, Carlos, Iulian, Jay, Gene, Genner, Omar, Osiris, Tomomi, Álvaro, Marlieke, Devon, Mireia, Giulia, Martina, Kwinten, Valerio, and Zara, I am extremely thankful to all of you for becoming my adopted family in Leiden. Your support, listening skills, and fun creativity made the office—and the after office—one of the most fun places in the world. Entertainment was not only a daily meal in the Faculty's corridors, but also at the Material Culture lab, where Loe, Eric, and Dennis had to constantly put up with me and my dusty sherds. Thank you for mentoring me and facilitating all of my analyses. I am also grateful to Erica, who supported me with archaeobotany. Aysha, Jaap, Loek, and Yunes, your constant good mood and laughter made a huge difference in my daily routine.

Dita, I do not think I would have survived Europe or Juigalpa without your sisterhood; Leiden has

never been the same without you, and you are greatly missed. Simone, I became the luckiest person in the world that night when we dreamed up our collaborative research future because I not only met one of the best lab buddies that I could have ever hoped for, but we also became family. Alas, you will have to cook for me for the rest of your life. Ana, your selfless friendship and eternal interest in my pots helped me through the roughest paths of this process. I am very happy to have you in my life, and you definitely transformed my Leiden experience. Olivier, Aleksandra, Gigi, Federico, and Veeka, your companionship was essential during these past few years. Sara and Lolo, thank you very much for being present in my life for almost two decades, for visiting me in Leiden, making fun of me, and helping me with the edition of the images for this manuscript.

The long months spent doing fieldwork and labwork in Juigalpa will always hold a special place in my memory. The project house was the center of operations of a huge team that gathered at least twice a year to develop archaeological research. Alejandro, when we met in Mexico in 2009, I could have never anticipated the long journey ahead of us. I am sure that finishing this research would have been impossible without you; you are the greatest listener I have ever met, and your calmness and gifted intuition guided me in blurry times. Kaz, Elisa, Gabriel, Antonio, Nagore, Samuel, Arnau, Pol, Yajaira, Irene, Lucía, William, Jamilt, Marling, Deyvis, Ben, and Leontien, this manuscript would not have been possible without you either, and I sincerely hope our paths cross again soon. Don Teyo, Sahirín, Noé, Nadine, and Thomas, you are wise, loving, and giving people, and your teachings and care transformed the way I see myself and Others. Adam and Carrie, thank you so much for your time and generosity. Lucy, meeting you and working with you has been an amazing journey, one that has taken us to many destinations and now will fulfil one of my dearest dreams: to explore together the Darién province of Panama. I am sure our collaboration will last many many years, and I hope we grow older together as archaeologists. Thank you very much for proofreading this manuscript.

On a more intimate note, this work would not have been possible without the advice of my dear aunt Silvana, who told me the precise words I needed to hear when doubting whether to start this project or not. *¡Gracias, tía!* My parents Isaac and Diana have been of enormous help, and the completion of this process is as much theirs as it is mine. The warmness of my siblings Fede, David, Leti, and Iván and my niece Violeta has always been the pillar that supports all of my adventures. In particular, *gracias* David for looking at Juigalpa and its potters with a completely different lens; your work together with Espora productions is at the intersection of research and love. And speaking of love, thank you Noah and Lorenzo for filling my days with laughter and happiness.

Appendices

Appendix 1

Mound form modifications

Modifications done to the form designed for Aguas Buenas to record the mounds found during the systematic survey:

- The model and owner of the photographic camera were added to avoid confusions related to picture numbers, due to multiple team members who took photographs simultaneously.
- Fundamental data such as date and team members were included to facilitate later inquiries regarding the records.
- Following Stark and Guarraty (2008), both parallel and ground visibility were annexed as variables and were classified as high, medium, or low. Ground visibility refers to vegetation density on the ground stepped by the analyst, while parallel visibility is connected to eye level. The former is usually affected by grasses and low vegetation, whereas the latter depends on tree height as well as plant species that grow to a height of more than 0.5 or 1 meter.
- In the mound measurement section, the variable of orientation in relationship to cardinal points was added for width and height measurements. Previous mapping practices detected high variability in the orientation of the lowest and narrowest parts of mounds, so this type of documentation was included to further study mound spatial patterns.
- In the category Current Land Use, the option Forest was included because during the pilot survey, several lots of land were intentionally forested, mainly for wood procurement.
- The material culture section was redesigned in order to acknowledge presence and absence of the different industries or materials present in the research area: ceramics, chipped stone (with obsidian as a separate variable), ground stone, fossils, mortars, petroglyphs, and basalt columns. The same codes used in the pilot survey were applied during mapping so as to enable comparative spatial analysis based on the different recording methods and their degree of resolution. Consequently, the surface distribution of artifacts from the different industries could be studied in relation to mounded sites and landscape features.
- The different densities of surface materials were annotated according to ranges of frequencies observed in previous fieldwork seasons. Consequently, 1-20 fragments was considered low material culture density, while 21-40 units was medium and more than 40 samples was recorded as high.
- In the mound morphology section, three variables were added to top shapes: elevated, surface level, or other. During the first mound recording phases, Arteaga observed high variability in the shapes of the mound tops, which included cases with an unleveled top. These modifications in the mound recording form took into account the fact that the morphology of the top of the mounds is not only related to the mound's overall shape as it is preserved today, but is also linked to its potential to hold other types of structures, as well as its connections to building techniques, destruction, and erosion patterns.
- The section dedicated to landscape relationships was almost completely

redesigned. To begin with, the category "against landscape" was discarded, because defining such a term is problematic. Instead, two different levels of adjustments to the landscape were included. The first one referred to direct relationships between mounds and specific elements of the landscape, such as alluvial plains, slopes, hilltops, foothills, plateaus, riverbanks, or plains. Second, the relative location of mounds in relationship to rivers, elevations, site design, or unidentified factors was also recorded. Accordingly, if a mound was found, for example, at the foot of a hill and near a river, the first variable was documented as the direct level of landscape relationship, while the second was taken into account as relative location.

- The mound preservation status category was replaced by mound conservation status. Moreover, four different levels of conservation were added: high, medium, low, and unidentified. Within the anthropic modification variable, the most common ones for the research area were taken into account, such as fence, road, plough, construction, looting, etc. For natural modifications, the same criterion was followed, so trees, burrows, insect impact, and other variables were included.
- For construction materials, the "earth" category was replaced by sediment. Additionally, the section dedicated to the types of rocks was expanded to include riverstone, sandstone, and limestone. Apart from that, the different sizes of rocks were now recorded according to their location within the different sections of the mounds: at the foot, slopes, or top of the structures. According to the observations conducted during fieldwork, the team decided to standardize the classification of rock sizes as follows: small (0-20 cm), medium (20-40 cm), and large (over 40 cm). Also, the possibility of mounds without rocks employed as construction materials was added.
- Regarding stone rings forming mounds, the category was expanded to allow for the documentation of several rings per structure, which were numbered from bottom to top. The old version of the form was confusing in cases with more than one circle of rocks.
- Finally, the team decided to follow Arteaga's preliminary mound typology and add his classification to the form. This typology included circumscribed leveled elevations, elevated foundations, piles of rocks—both large and small—and stone wheels (Arteaga 2017).

Appendix 2

2015A Site excavation form

SITE Form

PACEN

2015 EXCAVATION SEASON

Reference	**EAB**

General Info	
Supervisor	
Date	

Context
Site Land owner
Landmarks
Datum TS UTM E: UTM N:
Pic #

Modern land use	
Cattle ranching	
Agriculture	
Types of crops	
Ploughed?	
Plough orientation	
Burnt?	
Agricultura debris	
Description of the terrain:	
Loose rocks	
High density?	
Parallel visibility	H M L
Ground visibility	H M L
Soil types	
Grass types	
Trees	

EAB-U1	
UTM NE	
UTM SW	
N-S measurement	
E-W measurement	
Orientation	
Description	

EAB-U2	
UTM E	
UTM N	
N-S measurement	
E-W measurement	
Orientation	
Description	

Comments

Appendix 3

2015A Level excavation form

LEVEL FORM

PACEN
2015 EXCAVATION SEASON

General Info
Supervisor
Collaborators
Date

Features	
Floor	
Quarried rock	
Compacted surf	
With sherds	
With rocks	
Trash heap	
Hearth	
Other	

Archaeological Materials	
Ceramics	
Groundstone	
Chipped stone	
Figurine	
Spindle whorl	
Special Art.	
NI	
Zooarch remains	
Burial	
Shell	
Botanic remains	
Other	

Site	
Excavation	
Unit	
Level	
Depth	
Stratigraphic	
Unit	
Bag #	

Record	
Pic. #	
Drawing #	
TS points	

Comments

Appendix 4

2015A Stratigraphic unit excavation form

STRATIGRAPHIC UNIT FORM

PACEN
2015 EXCAVATION SEASON

General Info
Supervisor
Collaborators
Date

Stratigraphic unit	

Context	
Excavation unit	
Levels	
Depth	

Record	
Pic. #	
Drawing #	
Sample #	
Bag #	

Level variations	
Interphase	YES NO
Depth	
Others	

Description	
Soil type	
Color	
Texture	
Dry Munsell	
Wet Munsell	
Hardness	C S-C S
Humidity	H M L
Rocks	
Outcrops	
Other	
Organic remains	
Roots	
Charcoal	
Grass	
Insects	
Seeds	
Other	

Comments

Appendix 5

Ceramic quantification

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
AB	AB1	AB1I	AB1I2	AB1I2_2	NRD	27/Dec/16	180,3	94,8	25	The incised body was sampled because it might be the same vessel as in previous bag.
AB	AB1	AB1I	AB1I2	AB1I2_6	NRD	27/Dec/16	240,9	172,1	25	
AB	AB1	AB1I	AB1I3	AB1I3_15	NRD	19/Jan/17	229,7	118,3	30	
AB	AB1	AB1II	AB1II2	AB1II2_12	NRD	19/Jan/17	508,2	319,2	30	Only 1 with white slip (sampled)
AB	AB1	AB1II	AB1II2	AB1II2_9	NRD	27/Dec/16	668,4	382,6	30	Brushing, less incised than in previous bag.
AB	AB1	AB1II	AB1II3	AB1II3_17	NRD	27/Dec/16	645,6	973,4	35	NI: possible handle, but not sure. More closed shapes than beore, slightly more variety in decorations.
AB	AB1	AB1II	AB1II3	AB1II3_23	NRD	27/Dec/16	83,3	32,7	25	Base is too small to sample (less than 10mm)
AB	AB1	AB1II	AB1II4	AB1II4_29	NRD	26/Dec/16	132,4	104,6	25	Vertical incisions, then horizontal.
AB	AB1	AB1III	AB1III4	AB1III4_31	NRD	26/Dec/16	82,5	52,7	30	
AB	AB1	AB1III	AB1III4	AB1III4_42	NRD	26/Dec/16	2,7	0	20	SU under rocks.
AB	AB1	AB1III	AB1III4	AB1III4_49	NRD	26/Dec/16	7,5	4,1	25	SU under rocks.
AB1	AB1	AB1III	AB1III5	AB1III5_50	NRD	26/Dec/16	11,4	0	40	
AB	AB1	AB1IV	AB1IV5	AB1IV5_41	NRD	26/Dec/16	22,3	8,9	30	The open body that was left without sampling was decorated with red on orange paint. Level 5 has virtually no sherds.
AB	AB1	AB1P	AB1P?	AB1P?_47	NRD	27/Dec/16	0	6,2	20	
AB	AB2	AB2?	AB2??	AB2??_?	NRD	17/Jan/17	0	0	40	Decontextualized bag, white slip, red/orange/white.
AB	AB2	AB2I	AB2I1	AB2I1_22	NRD	17/Jan/17	261,5	111,1	25	
AB	AB2	AB2III	AB2III3	AB2II?_67	NRD	17/Jan/17	0	103	50	Red slip outside.
AB	AB2	AB2II	AB2II2	AB2II2_35	NRD	17/Jan/17	1108	888	40	2 bases anulares.
AB	AB2	AB2II	AB2II2	AB2II2_39	NRD	17/Jan/17	533,2	551	30	
AB	AB2	AB2II	AB2II2	AB2II2_57	NRD	17/Jan/17	1281	1339,6	35	Algunas formas abiertas tienen el exterior muy erosionado.
AB	AB2	AB2II	AB2II2	AB2II2_58	NRD	17/Jan/17	527,9	473	30	
AB	AB2	AB2II	AB2II2	AB2II2_60	NRD	24/Jan/17	642,6	882,2	30	
AB	AB2	AB2III	AB2III3	AB2III3_36	NRD	17/Jan/17	0	3,6	20	
AB	AB2	AB2III	AB2III3	AB2III3_54	NRD	17/Jan/17	57,4	27,2	35	
AB	AB2	AB2IV	AB2IV3	AB2IV3_56	NRD	17/Jan/17	234,5	143,5	35	
AB	AB3	AB3II	AB3II2	AB3II2_84	NRD	17/Jan/17	123,5	70,7	25	Incised are different than in units 1 and 2, they are of a rougher technique.
AB	AB3	AB3II	AB3II2	AB3II2_86	NRD	17/Jan/17	5,3	2,4	20	
AB	AB3	AB3III	AB3III?	AB3III?_119	NRD	17/Jan/17	0	20,9	20	
AB	AB3	AB3III	AB3III3	AB3III3_133	NRD	17/Jan/17	471,7	228,5	30	Hay bastardos.
AB	AB3	AB3IV	AB3IV4	AB3IV4_90	NRD	17/Jan/17	131,5	10,6	30	Material más erosionado, tamaño más grande que unidades 1 y 2.
AB	AB3	AB3IV	AB3IV4	AB3IV4_99	NRD	17/Jan/17	19,7	26,3	30	Una base tiene cicatriz de soporte (50mm diámetro), o quizás base anular?
AB	AB4	AB4?	AB4??	AB4??_??	NRD	17/Jan/17	0	72,5	30	Descontextualizado Marie.
AB	AB4	AB4II	AB4II1	AB4II1_66	NRD	17/Jan/17	14,4	2,9	10	
AB	AB4	AB4II	AB4II2	AB4II2_81	NRD	17/Jan/17	477,6	177,4	40	Cuerpos abiertos sobrecocidos y no corresponden a la vasija de la capa III.
AB	AB4	AB4III	AB4III3	AB4II3_91	NRD	17/Jan/17	69,7	7,2	30	Vasija abierta sobrecocida.
AB	AB4	AB4II	AB4IIF	AB4IIF_132	NRD	17/Jan/17	0	2,5	20	
AB	AB4	AB4III	AB4III2	AB4III2_125	NRD	17/Jan/17	4,7	0	20	Cocción a baja temperatura.
AB	AB5	AB5II	AB5II1	AB5II1_65	NRD	29/Dec/16	1,1	1,1	15	
AB	AB5	AB5II	AB5II2	AB5II2_173	NRD	28/Dec/16	44,8	60,2	25	
AB	AB5	AB5III	AB5III2	AB5III2_109	NRD	27/Dec/16	1,4	0	10	
AB	AB5	AB5III	AB5III3	AB5III3_106	NRD	27/Dec/16	11,2	0,6	25	Muy mala conservación
AB	AB5	AB5III	AB5III4	AB5III4_110	NRD	27/Dec/16	2,1	0	20	
AB	AB6	AB6II	AB6II2	AB6II2_112	NRD	26/Dec/16	61,6	22,4	20	Material más erosionado y fragmentado que en las otras bolsas.
AB	AB6	AB6II	AB6II3	AB6II3_114	NRD	14/Jan/17	81,2	32,7	25	
AM	AM1	AM1?	AM1??	AM1??_32	NRD	13/Jan/17	12,8	0	20	

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
AM	AM1	AM1I	AM1I1	AM1I1_1	NRD	13/Jan/17	17,7	0	30	
AM	AM1	AM1I	AM1I5	AM1I5_4	NRD	13/Jan/17	15,8	0	30	
AM	AM1	AM1IB	AM1IB2	AM1IB2_7	NRD	13/Jan/17	15,5	0	20	
AM	AM1	AM1IB	AM1IB3	AM1IB3_5	NRD	13/Jan/17	9,2	0	20	
AM	AM1	AM1IB	AM1IB4	AM1IB4_6	NRD	13/Jan/17	12,1	0	25	
AM	AM1	AM1II	AM1II?	AM1II?_31	NRD	13/Jan/17	24,2	0	30	
AM	AM1	AM1II	AM1II3	AM1II3_8	NRD	13/Jan/17	47,2	0	90	Incisiones verticales.
AM	AM1	AM1II	AM1II4	AM1II4_14	NRD	13/Jan/17	32,2	0	30	
AM	AM1	AM1II	AM1II4	AM1II4_9	NRD	13/Jan/17	36,3	0	45	
AM	AM1	AM1II	AM1II5	AM1II5_12	NRD	13/Jan/17	58,9	0	35	
AM	AM1	AM1II	AM1II6	AM1II6_19	NRD	13/Jan/17	83,7	0	30	
AM	AM1	AM1IIa	AM1IIa4	AM1IIa4_10	NRD	13/Jan/17	31	0	30	
AM	AM1	AM1IIa	AM1IIa4	AM1IIa4_15	NRD	13/Jan/17	71,6	0	35	
AM	AM1	AM1IIa	AM1IIa5	AM1IIa5_16	NRD	13/Jan/17	55,9	0	30	
AM	AM1	AM1IIa	AM1IIa6	AM1IIa6_17	NRD	13/Jan/17	2,7	0	25	
AM	AM1	AM1IV	AM1IV2	AM1IV2_11	NRD	13/Jan/17	136,1	0	30	
AM	AM1	AM1V	AM1V4	AM1V4_18	NRD	13/Jan/17	18,7	0	25	
AM	AM1	AM1VI	AM1VI6	AM1VI6_22	NRD	13/Jan/17	2,3	0	20	
AM	AM1	AM1VI	AM1VI7	AM1VI7_39	NRD	13/Jan/17	90,6	0	35	Rim neck con impresiones al estilo Carca
AM	AM1	AM1VII	AM1VII11	AM1VII11_28	NRD	13/Jan/17	18,9	0	25	
AM	AM1	AM1VII	AM1VII12	AM1VII12_30	NRD	13/Jan/17	0,7	0	10	
AM	AM1	AM1VII	AM1VII7	AM1VII7_24			40	0	20	
AM	AM1	AM1VII	AM1VII7	AM1VII7_34	NRD	13/Jan/17	12,4	0	25	
AM	AM1	AM1VII	AM1VII8	AM1VII8_26	NRD	13/Jan/17	20,7	0	35	
AO	AO?	AO?SUP	AO?SUP?	AO?SUP?_15	NRD	02/Jan/17	50	0	63	Se muestrea igual porque es el único ejemplar de algo bien diagnóstico en Alberto Obando: la decoración con un rollo aplicado (aparentemente al exterior e interior), así como un lug en forma de ojo.
AO	AO1	AO1III	AO1III3	AO1III3_5	NRD	30/Dec/16	553,3	446	25	Material mejor conservado que el nivel más profundo.
AO	AO1	AO1III	AO1III3	AO1III3_6	NRD	30/Dec/16	939,8	621,6	30	Material bastante erosionado pero mucho mejor consevado que el nivel más profundo de la unidad. Mucha variabilidad en soportes y bordes, mayoría de formas abiertas. Parece que hubiera platos
AO	AO1	AO1IV	AO1IV4	AO1IV4_11	NRD	30/Dec/16	238,7	75,7	25	Material menos erosionado que el nivel 5, se conservan algunos engobes y ya es más fácil distinguir abierto de cerrado y las partes de las vasijas. Más formas abiertas que cerradas
AO	AO1	AO1IV	AO1IV5	AO1IV5_56	NRD	30/Nov/16	124,1	75,9	25	Material muy erosionado, resulta dificil diferenciar formas abiertas de cerradas, practicamente no se han conservado los engobes y los bordes son dificiles de identificar porque las fracturas estan erosionadas
AO	AO2	AO2I	AO2I2	AO2I2_59	NRD	02/Jan/17	9,8	0	30	
AO	AO2	AO2I	AO2I2	AO2I2_7	NRD	02/Jan/17	2,7	0	15	
AO	AO2	AO2II	AO2II2	AO2II2_21	NRD	02/Jan/17	7,6	0	25	
AO	AO2	AO2II	AO2II3	AO2II3_25	NRD	02/Jan/17	20	0	30	
AO	AO2	AO2II	AO2II3	AO2II3_27	NRD	02/Jan/17	16,6	9,3	0	
AO	AO2	AO2II	AO2II3	AO2II3_33	NRD	02/Jan/17	9,7	0	30	Uno de los fragmentos tiene el interior ahumado.
AO	AO2	AO2II	AO2II3	AO2II3_58	NRD	02/Jan/17	42,8	0	30	
AO	AO2	AO2III	AO2III3	AO2III3_26	NRD	02/Jan/17	4,3	0	20	
AO	AO2	AO2III	AO2III3	AO2III3_60	NRD	02/Jan/17	0,8	0	15	Ahumado al exterior.

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
AO	AO3	AO3II	AO3II3	AO3II3_14	NRD	02/Jan/17	83,6	21,3	35	La base es bastarda y tiene huella de soporte
AO	AO3	AO3II	AO3II3	AO3II3_19	NRD	02/Jan/17	57,3	0	33	
AO	AO3	AO3II	AO3II4	AO3II4_57	NRD	30/Dec/16	87,2	0	35	El NI es una vasija de paredes gruesas extremadamente erosionada.
JH	JH2	JH2II	JH2II2	JH2II2_7	NRD	13/Jan/17	4,4	0	30	
JH	JH2	JH2II	JH2II3	JH2II3_30	NRD	13/Jan/17	3,8	0	30	
JH	JH4	JH4II	JH4II2-3	JH4II2-3_25	NRD	13/Jan/17	21,1	0	20	
JH	JH5	JH5I	JH5I2	JH5I2_24	NRD	13/Jan/17	3,4	0	20	
JH	JH5	JH5I	JH5I2	JH5I2_27	NRD	13/Jan/17	7,4	0	20	
JH	JH5	JH5S	JH5S1	JH5S1_20	NRD	06/Jan/17	5,8	0	20	
JOR	JOR1B	JOR1BH	JOR1BH17	JOR1BH17_1	NRD	07/Jan/17	0	18,4	30	
JOR	JOR1C	JOR1CH	JOR1CH16	JOR1CH16_4	NRD	07/Jan/17	0	51,5	0	
JOR	JOR2	JOR2?	JOR2??	JOR2??_101	NRD	07/Jan/17	0	26,3	0	Uno de los cuerpos abiertos tiene engobe negro al interior. Un tiesto sobrecocido.
JOR	JOR2	JOR2I	JOR2I5	JOR2I5_11	NRD	07/Jan/17	4,4	0	25	
JOR	JOR2	JOR2I	JOR2I5	JOR2I5_3	NRD	07/Jan/17	295,6	159,9	30	Pintura negra.
JOR	JOR2	JOR2I	JOR2I5	JOR2I5_8	NRD	07/Jan/17	16,5	38,8	30	
JOR	JOR2	JOR2I	JOR2I6	JOR2I6_4	NRD	07/Jan/17	82,7	45,8	30	
JOR	JOR2	JOR2II	JOR2II5	JOR2II5_13	NRD	07/Jan/17	5,4	0	15	Tiene huella de desgaste con herramienta puntuda.
JOR	JOR2	JOR2II	JOR2II5	JOR2II5_14	NRD	07/Jan/17	9,5	0	20	Incisiones paralelas con instrumento
JOR	JOR2	JOR2II	JOR2II5	JOR2II5_15	NRD	07/Jan/17	60,2	0	70	
JOR	JOR2	JOR2II	JOR2II5	JOR2II5_16	NRD	07/Jan/17	11	0	35	
JOR	JOR2	JOR2II	JOR2II5	JOR2II5_17	NRD	07/Jan/17	26,8	0	55	
JOR	JOR2	JOR2II	JOR2II5	JOR2II5_18	NRD	07/Jan/17	34,2	0	45	
JOR	JOR2	JOR2II	JOR2II5	JOR2II5_19	NRD	07/Jan/17	32,3	0	60	
JOR	JOR2	JOR2II	JOR2II5	JOR2II5_21	NRD	07/Jan/17	15,9	0	40	
JOR	JOR2	JOR2II	JOR2II5	JOR2II5_24	NRD	07/Jan/17	118	93,7	30	
JOR	JOR2	JOR2II	JOR2II5	JOR2II5_25	NRD	07/Jan/17	1137,5	1063	30	Engobe negro en un par de tiestos. El appliqué tiene impresiones con herramienta. Appliué de chipote en otra.
JOR	JOR2	JOR2II	JOR2II5	JOR2II5_27	NRD	07/Jan/17	539	315,2	30	Un tiesto sobrecocido
JOR	JOR2	JOR2II	JOR2II5	JOR2II5_33	NRD	07/Jan/17	13,9	0	40	
JOR	JOR2	JOR2III	JOR2III5	JOR2III5_28	NRD	07/Jan/17	13,1	0	20	Con huella de presión y posible desgaste.
JOR	JOR2	JOR2III	JOR2III6	JOR2III6_29	NRD	07/Jan/17	13,3	0	25	
JOR	JOR2	JOR2III	JOR2III6	JOR2III6_30	NRD	07/Jan/17	13,5	0	30	
JOR	JOR2	JOR2III	JOR2III6	JOR2III6_31	NRD	07/Jan/17	11,9	0	45	
JOR	JOR2	JOR2III	JOR2III6	JOR2III6_34	NRD	07/Jan/17	695,3	461	30	Chipote, un tiesto claramente sobrecocido.
JOR	JOR2	JOR2IV	JOR2IV6	JOR2IV6_32	NRD	07/Jan/17	16,4	0	35	
JOR	JOR2	JOR2IV	JOR2IV6	JOR2IV6_68	NRD	07/Jan/17	416,8	140,4	30	Uno de los rim/necks abiertos es en realidad una base punzonada al interior y con cicatriz de soporte,parece pertenecer a un plato.
JOR	JOR2	JOR2IVa	JOR2IVa6	JOR2IVa6_75	NRD	07/Jan/17	10,3	0	30	
JOR	JOR2	JOR2IVa	JOR2IVa6	JOR2IVa6_76	NRD	07/Jan/17	31,1	0	75	
JOR	JOR2	JOR2IVa	JOR2IVa6	JOR2IVa6_77	NRD	07/Jan/17	17,1	0	60	
JOR	JOR2	JOR2IVa	JOR2IVa6	JOR2IVa6_78	NRD	07/Jan/17	125,4	0	125	
JOR	JOR2	JOR2IVa	JOR2IVa6	JOR2IVa6_79	NRD	07/Jan/17	46,8	0	65	
JOR	JOR2	JOR2IVa	JOR2IVa6	JOR2IVa6_80	NRD	07/Jan/17	7,9	0	40	
JOR	JOR2	JOR2IVa	JOR2IVa6	JOR2IVa6_81	NRD	07/Jan/17	7,9	0	45	
JOR	JOR2	JOR2IVa	JOR2IVa6	JOR2IVa6_82	NRD	07/Jan/17	9,8	0	40	
JOR	JOR2	JOR2IVa	JOR2IVa6	JOR2IVa6_83	NRD	07/Jan/17	130,1	0	75	
JOR	JOR2	JOR2IVa	JOR2IVa7	JOR2IVa7_71	NRD	07/Jan/17	63,4	33,5	25	
JOR	JOR2	JOR2IVa	JOR2IVa7	JOR2IVa7_86	NRD	07/Jan/17	197,5	46,3	30	
JOR	JOR2	JOR2V	JOR2V6	JOR2V6_40	NRD	07/Jan/17	56,4	0	40	
JOR	JOR2	JOR2V	JOR2V6	JOR2V6_41	NRD	07/Jan/17	172,7	0	100	Rollos bien claros.

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JOR	JOR2	JOR2V	JOR2V6	JOR2V6_42	NRD	07/Jan/17	27,8	0	65	
JOR	JOR2	JOR2V	JOR2V6	JOR2V6_43	NRD	07/Jan/17	165,6	0	135	
JOR	JOR2	JOR2V	JOR2V6	JOR2V6_44	NRD	07/Jan/17	73,9	0	110	
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_37	NRD	07/Jan/17	66,5	0	45	
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_38	NRD	07/Jan/17	147,7	0	110	
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_39	NRD	07/Jan/17	19,4	0	45	Asa entrelazada
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_45	NRD	07/Jan/17	609	266,1	30	Engobe rojo sobre naranja, café, negro. El asa es de rollo.
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_51	NRD	07/Jan/17	98,6	0	40	
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_52	NRD	07/Jan/17	148,6	0	130	
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_53	NRD	07/Jan/17	19,4	0	55	Engobe rojo.
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_54	NRD	07/Jan/17	14,8	0	45	
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_55	NRD	07/Jan/17	20,5	0	65	Engobe rojo.
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_56	NRD	07/Jan/17	17,7	0	55	
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_57	NRD	07/Jan/17	33,8	0	40	Engobe rojo sobre naranja.
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_58	NRD	07/Jan/17	100,7	0	60	
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_59	NRD	07/Jan/17	21,3	0	45	Engobe rojo sobre naranja.
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_60	NRD	07/Jan/17	53,2	0	75	Borde biselado al interior (viene apareciendo desde el nivel inferior. Engobe café sobre barbotina.
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_61	NRD	07/Jan/17	77,8	0	125	
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_62	NRD	07/Jan/17	45,4	0	0	
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_63	NRD	07/Jan/17	97,4	0	110	
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_64	NRD	07/Jan/17	20	0	45	Engobe rojo al exterior.
JOR	JOR2	JOR2V	JOR2V7	JOR2V7_91	NRD	07/Jan/17	61,2	46,6	35	
JOR	JOR2	JOR2VI8	JOR2VI7	JOR2VI7_48	NRD	07/Jan/17	332,2	160,8	35	El apliqué tiene impresiones con herramienta.
JOR	JOR2	JOR2VI	JOR2VI7	JOR2VI7_66	NRD	07/Jan/17	55,9	0	80	
JOR	JOR2	JOR2VI	JOR2VI7	JOR2VI7_67	NRD	07/Jan/17	279	0	60	
JOR	JOR2	JOR2VI	JOR2VI7	JOR2VI7_74	NRD	07/Jan/17	10,7	0	30	
JOR	JOR2	JOR2VI8_92	JOR2VI8_92	JOR2VI8_92	NRD	07/Jan/17	465,6	401,6	35	Engobes rojos, appliqué de chipote
JOR	JOR2	JOR2VII	JOR2VII8	JOR2VII8_95	NRD	07/Jan/17	88,2	0	90	Possible base, check.
JOR	JOR2	JOR2VII	JOR2VII9	JOR2VII9_96	NRD	07/Jan/17	300,3	193,1	35	Chipotes. Cuellos con engobe rojo
JOR	JOR2	JOR2VII	JOR2VII9	JOR2VII9_98	NRD	07/Jan/17	34,8	6,7	20	
LA	LA1	LA1I	LA13	LA13_14	NRD	02/Jan/17	169	105	25	Similar a capa II, pero hay una asa. Posible teja. Cuellos con impresiones digitales al exterior.
LA	LA1	LA1I	LA1I2	LA1I2_1	NRD	02/Jan/17	372,9	293,3	30	Posibles tejas. Un cuerpo con engobe rojo, el primero en toda la unidad.
LA	LA1	LA1II	LA1II2	LA1II2_4	NRD	02/Jan/17	236,9	179,4	25	Las bases tienen huellas de impresión textil en el interior y los cuellos impresiones digitales en el exterior. Posible teja.
LA	LA1	LA1II	LA1II2	LA1II2_5	NRD	02/Jan/17	185,5	17,1	30	Impresión textil al interior de la vasija, ahumados internos y externos, huellas de shaving, cepillado, impresiones digitales.
LA	LA1	LA1II	LA1II3	LA1II3_11	NRD	02/Jan/17	1586	1254,4	30	Igual que las otras dos bolsas, material de tendal y/o teja, ahumados, impresiones digitales en los cuellos, comales ahumados.
LA	LA1	LA1II	LA1II3	LA1II3_22	NRD	02/Jan/17	647,7	436,6	25	Ahumados al interior y exterior. Bordes y cuellos con impresiones digitales. Bordes muy erosionados al exterior, con una especie de flap de erosión. Buena conservación. Se observan algunos voids planares y paralelos a la superficie, al centro. Comal

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
LA	LA1	LA1II	LA1II3	LA1II3_23	NRD	02/Jan/17	1206,6	1034,9	30	Muchas impresiones digitales, buena conservación, mayoría absoluta de formas abiertas. Checar huellas de percusión. Shaving, granos volados, granos flotantes. Hay fragmentos muy gruesos que parecen teja, pero son demasiado planos (tendales?).
LA	LA1	LA1II	LA1II3	LA1II3_24	NRD	02/Jan/17	353,2	197,8	30	
LA	LA1	LA1II	LA1II4	LA1II4_31	NRD	02/Jan/17	373	268	30	Impresiones digitales en cuellos, casi totalidad de formas abiertas. Buena preservación, casi no hay engobes de colores.
LA	LA2	LA2I	LA2I10	LA2I10_19	NRD	02/Jan/17	76,3	133,2	25	Mucha posible teja.
LA	LA2	LA2I	LA2I11	LA2I11_27	NRD	02/Jan/17	81	675	30	
LA	LA2	LA2II	LA2II10	LA2II10_20	NRD	02/Jan/17	52,8	68,7	20	
LA	LA2	LA2III	LA2III10	LA2III10_21	NRD	02/Jan/17	131,5	270,8	25	
LA	LA2	LA2III	LA2III11	LA2III11_26	NRD	02/Jan/17	96,3	398,1	30	
LA	LA2	LA2V	LA2V11	LA2V11_35	NRD	02/Jan/17	41,1	0	0	
LA	LA2	LA2VI	LA2VI11	LA2VI11_55	NRD	02/Jan/17	18	24,2	35	Parece pura teja.
LA	LA2	LA2VI	LA2VI12	LA2VI12_34	NRD	02/Jan/17	18	0	35	
LA	LA3	LA3I	LA3I1	LA3I1_28	NRD	02/Jan/17	9	10,6	20	
LA	LA3	LA3I	LA3I	LA3I2_36	NRD	02/Jan/17	718,9	489,6	25	Impresiones digitales en cuellos, posibles tejas, se parece a la ceramica de la unidad 1.
LA	LA3	LA3I	LA3I2	LA3I2_48	NRD	02/Jan/17	164,2	138	25	No hay teja.
LA	LA3	LA3II	LA3II4	LA3II4_53	NRD	02/Jan/17	11,2	0	35	
LA	LA3	LA3III	LA3III3	LA3III3_51	NRD	02/Jan/17	43,6	11,3	25	
LD	LD?	LD??	LD???	LD???_36/75	NSG	26/Jan/17	0	2657,6	40	Descontextualizado. Mezcla de bolsas: LD1V3_36 y LD2VII2_75.
LD	LD?	LD??	LD???	LD???_74	NSG	26/Jan/17	0	487,2	70	Donación de Luisa Diaz
LD	LD1AB	LD1ABXIV	LD1ABXIV5	LD1ABXIV5_174	NSG	25/Jan/17	12,3	0	55	Horizontal. Pintura roja sobre engobe blanco al exterior y pintura negra sobre engobe blanco al interior. Se aprecia un carenado después del Neck.
LD	LD1AB	LD1ABXIV	LD1ABXIV5	LD1ABXIV5_177	NSG	26/Jan/17	394,2	195,5	45	Una de las closed body tiene restos de carbón al interior.
LD	LD1AB	LD1ABXV	LD1ABXV6	LD1ABXV6_191	NSG	25/Jan/17	31,3	0	35	
LD	LD1AB	LD1ABXV	LD1ABXV6	LD1ABXV6_193	NSG	24/Jan/17	321,7	227,7	35	
LD	LD1AB	LD1ABXVII	LD1ABXVII6	LD1ABXVII6_210	NSG	24/Jan/17	188	89,7	30	
LD	LD1A	LD1AH	LD1AH2	LD1AH2_1	NSG	23/Jan/17	0	5	1	
LD	LD1A	LD1AII	LD1AII2	LD1AII2_4	NSG	23/Jan/17	124,6	111	25	
LD	LD1A	LD1AII	LD1AII2	LD1AII2_6	NSG	23/Jan/17	51,8	0	75	Horizontal
LD	LD1A	LD1AIIa	LD1AIIa2	LD1AIIa2_18	NSG	23/Jan/17	0	0,4	10	
LD	LD1A	LD1AIII	LD1AIII2	LD1AIII2_13	NSG	24/Jan/17	10,4	0	30	Con incisiones en la parte superior.
LD	LD1A	LD1AIII	LD1AIII2	LD1AIII2_14	NSG	23/Jan/17	825	110,3	30	
LD	LD1A	LD1AIII	LD1AIII2	LD1AIII2_19	NSG	23/Jan/17	105,4	0	30	
LD	LD1A	LD1AIII	LD1AIII2	LD1AIII2_20	NSG	23/Jan/17	83,3	0	3,5	
LD	LD1A	LD1AIII	LD1AIII2	LD1AIII2_21	NSG	23/Jan/17	27,5	0	6	
LD	LD1A	LD1AIII	LD1AIII2	LD1AIII2_22	NSG	23/Jan/17	34,2	0	50	Engobe en el exterior
LD	LD1A	LD1AIII	LD1AIII2	LD1AIII2_23	NSG	23/Jan/17	138,8	18	7	
LD	LD1A	LD1AIII	LD1AIII2	LD1AIII2_44	NSG	24/Jan/17	147,9	0	45	Contexto: Perfil W. Con engobes
LD	LD1A	LD1AIII	LD1AIII2	LD1AIII2_7	NSG	23/Jan/17	30,3	0	45	Engobe rojo al interior
LD	LD1A	LD1AIII	LD1AIII2	LD1AIII2_8	NSG	23/Jan/17	83,2	0	90	
LD	LD1A	LD1AIII	LD1AIII2	LD1AIII2_9	NSG	23/Jan/17	432,3	381,1	3,5	Las incisas abierta están incisas por la cara interna. Las closed por la parte de fuera.
LD	LD1A	LD1AIIIa	LD1AIIIa2	LD1AIIIa2_27	NSG	23/Jan/17	0	70	25	
LD	LD1A	LD1AP	LD1AP?	LD1AP?_175	NSG	26/Jan/17	0	299	40	
LD	LD1A	LD1AP	LD1AP?	LD1AP?_64	NSG	26/Jan/17	2,2	0	20	

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
LD	LD1A	LD1AV	LD1AV2	LD1AV2_33	NSG	23/Jan/17	78,3	0	30	Uno de los Rim/neck además tiene carenado.
LD	LD1A	LD1AV	LD1AV2	LD1AV2_34	NSG	23/Jan/17	82,5	0	40	Estaban en posición horizontal en el contacto entre capas. El Rim/Neck white slip tiene decoraciones lineales negras en el exterior y geométricas rojas y negras en el interior. Además, presenta una especie de carenado al final.
LD	LD1A	LD1AV	LD1AV2	LD1AV2_35	NSG	23/Jan/17	106	43	35	
LD	LD1A	LD1AV3	LD1AV3	LD1AV3_102	NSG	26/Jan/17	0	4	20	
LD	LD1A	LD1AV	LD1AV3	LD1AV3_36	NSG	24/Jan/17	124,9	0	1	Body white slip decoración geométrica pintada
LD	LD1A	LD1AV	LD1AV3	LD1AV3_45	NSG	24/Jan/17	9,6	0	45	
LD	LD1A	LD1AV	LD1AV3	LD1AV3_46	NSG	24/Jan/17	25,7	0	55	Horizontal.
LD	LD1A	LD1AV	LD1AV3	LD1AV3_47	NSG	24/Jan/17	16,9	0	55	Horizontal
LD	LD1A	LD1AV	LD1AV3	LD1AV3_48	NSG	24/Jan/17	23	0	45	Horizontal.
LD	LD1A	LD1AV	LD1AV3	LD1AV3_49	NSG	24/Jan/17	17,3	0	4,5	Interesante para tecnología.
LD	LD1A	LD1AV	LD1AV3	LD1AV3_51	NSG	24/Jan/17	16,8	0	40	Horizonatal. Pintura roja al exterior.
LD	LD1A	LD1AV	LD1AV3	LD1AV3_52	NSG	24/Jan/17	11,6	0	30	Horizontal.
LD	LD1A	LD1AV	LD1AV3	LD1AV3_53	NSG	24/Jan/17	9,7	0	40	Horizontal.
LD	LD1A	LD1AV	LD1AV3	LD1AV3_54	NSG	24/Jan/17	17,1	0	50	
LD	LD1A	LD1AV	LD1AV3	LD1AV3_55	NSG	24/Jan/17	22,2	0	45	Horizontal.
LD	LD1A	LD1AV	LD1AV3	LD1AV3_56	NSG	24/Jan/17	21,3	0	50	
LD	LD1A	LD1AV	LD1AV3	LD1AV3_57	NSG	24/Jan/17	37,6	0	60	Horizontal. Engobe rojo al interior. Incisión al final del Neck.
LD	LD1A	LD1AV	LD1AV3	LD1AV3_58	NSG	24/Jan/17	23,6	0	50	Horizontal.
LD	LD1A	LD1AV	LD1AV3	LD1AV3_59	NSG	24/Jan/17	6	0	30	Horizontal.
LD	LD1A	LD1AV	LD1AV3	LD1AV3_60	NSG	24/Jan/17	17,4	0	60	
LD	LD1A	LD1AV	LD1AV3	LD1AV3_61	NSG	24/Jan/17	24,8	0	55	
LD	LD1A	LD1AV	LD1AV3	LD1AV3_62	NSG	24/Jan/17	12,2	0	45	
LD	LD1A	LD1AV	LD1AV3	LD1AV3_65	NSG	24/Jan/17	266,6	114,3	30	1 open body insiced tiene incisiones en el interior (finas) y en el exterior (gruesas)
LD	LD1A	LD1AV	LD1AV3	LD1AV3_69	NSG	24/Jan/17	13,5	0	45	Horizontal. Tiene carenado al final. Engobe rojo al interior y al exterior.
LD	LD1A	LD1AV	LD1AV3	LD1AV3_70	NSG	24/Jan/17	9,5	0	40	
LD	LD1A	LD1AV	LD1AV3	LD1AV3_73	NSG	24/Jan/17	31,2	87,2	25	
LD	LD1A	LD1AVa	LD1AVa2	LD1AVa2_76	NSG	26/Jan/17	0	48,9	30	
LD	LD1A	LD1AVa	LD1AVa3	LD1AVa3_90	NSG	26/Jan/17	0	102,4	45	
LD	LD1A	LD1AVb	LD1AVb3	LD1AVb3_92	NSG	26/Jan/17	0	31,7	25	
LD	LD1A	LD1AVI	LD1AVI3	LD1AVI3_111	NSG	24/Jan/17	15,5	0	30	
LD	LD1A	LD1AVI	LD1AVI3	LD1AVI3_82	NSG	24/Jan/17	28	0	60	Horizontal. Contacto entre capas (inicio SVI)
LD	LD1A	LD1AVI	LD1AVI3	LD1AVI3_83	NSG	24/Jan/17	63,2	0	9	Horizontal. Dudosa con base. Dos apliques con forma de pezoncitos.
LD	LD1A	LD1AVI	LD1AVI3	LD1AVI3_84	NSG	24/Jan/17	21,4	0	55	Blanco sobre rojo. En contacto entre capas (inicio de VI)
LD	LD1A	LD1AVI	LD1AVI3	LD1AVI3_85	NSG	24/Jan/17	42,7	0	45	Horizontal. Contacto entre capas (Inicio SVI)
LD	LD1A	LD1AVI	LD1AVI3	LD1AVI3_86	NSG	24/Jan/17	47	0	85	Tiene negativo de aplique.
LD	LD1A	LD1AVI	LD1AVI3	LD1AVI3_87	NSG	24/Jan/17	525,1	170,2	35	Pimtura geométrica en closed Rim/Neck white slip.
LD	LD1A	LD1AVI	LD1AVI4	LD1AVI4_114	NSG	24/Jan/17	871	245	35	Conjunto heterogéneo en acabados y decoraciones. Open NI con negativo de pintura al interior. 1 Open Body podría ser un vaso (forma extraña)
LD	LD1A	LD1AVI	LD1AVI4	LD1AVI4_118	NSG	25/Jan/17	13,4	0	35	Incisiones finas en la parte superior.
LD	LD1A	LD1AVI	LD1AVI4	LD1AVI4_119	NSG	24/Jan/17	782,2	322,4	50	Ahumada con resto de carbón.

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
LD	LD1A	LD1AVI	LD1AVI4	LD1AVI4_97	NSG	24/Jan/17	999,5	496,7	45	Engobe blanco con diferentes estados de "conservación". Cerámicas closed body ahumadas. Rim/Neck incised tiene también Shoulder.
LD	LD1A	LD1AVIa	LD1AVIa3	LD1AVIa3_124	NSG	26/Jan/17	0	80	40	Carbón adherido al interior de open body.
LD	LD1A	LD1AVIa	LD1AVIa4	LD1AVIa4_126	NSG	26/Jan/17	0	216,4	3,5	
LD	LD1A	LD1AVIb	LD1AVIb3	LD1AVIb3_106	NSG	26/Jan/17	0	50	35	Puede que closed body tenga incisiones.
LD	LD1A	LD1AXI	LD1AXI4	LD1AXI4_136	NSG	25/Jan/17	32,2	0	75	Horizontal. ¿Quemada?
LD	LD1A	LD1AXI	LD1AXI5	LD1AXI5_137	NSG	25/Jan/17	374	224	30	Aplique redondeado con forma de pezón no picudo.
LD	LD1A	LD1AXI	LD1AXI5	LD1AXI5_146	NSG	26/Jan/17	911,6	555,9	35	Puede que una de las Open Base tenga incisión.
LD	LD1A	LD1AXIa	LD1AXIa5	LD1AXIa5_186	NSG	26/Jan/17	0	64,5	25	
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_154	NSG	25/Jan/17	47,8	0	70	Fragmentos de carbón adheridos al interior.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_155	NSG	25/Jan/17	66,1	0	90	Horizontal. Decoración aplique zoomórfico.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_156	NSG	24/Jan/17	27,1	0	40	Horizontal.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_159	NSG	24/Jan/17	61,9	0	105	Buena para termo. Buena para marcas de acabado.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_160	NSG	24/Jan/17	64,2	0	100	Buena para tecnología: Marcas de acabado superficial(afeitado al interior) y manufactura (enrollado en el perfil)
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_161	NSG	25/Jan/17	8,9	0	40	Aplique con morfología redondeada. No está completo.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_162	NSG	25/Jan/17	41,1	0	60	Horizontal. Interesante para tecnología: Manufactura y cocción
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_163	NSG	24/Jan/17	68,8	0	10	Horizontal.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_164	NSG	24/Jan/17	171	0	100	Horizontal. Trazas de manufactura (doble rollo) y acabado muy evidentes.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_165	NSG	24/Jan/17	43,8	0	70	Horizontal.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_166	NSG	24/Jan/17	14,7	0	40	Parace que tiene arranque de support.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_167	NSG	25/Jan/17	14,7	0	40	Horizontal.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_168	NSG	24/Jan/17	8,2	0	30	Horizontal. Incisiones no superpuestas.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_169	NSG	25/Jan/17	20,8	0	60	Interior Ahumado.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_170	NSG	24/Jan/17	7,2	0	35	Horizontal.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_171	NSG	25/Jan/17	115,3	0	110	Horizontal.
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_172	NSG	24/Jan/17	53,9	0	35	
LD	LD1A	LD1AXIV	LD1AXIV5	LD1AXIV5_180	NSG	26/Jan/17	733	384,4	30	Decoraciones pintadas negras y rojas en Rim/Neck white slip.
LD	LD1A	LD1AXV	LD1AXV6	LD1AXV6_189	NSG	26/Jan/17	657,2	463,2	40	Handle tiene pintura blanca. Hay Open Body con pintura negra. Closed body con carbón adherido al interior. Una de las closed base tiene trazas de manufactura muy interesantes.
LD	LD1A	LD1AV	LD1AV3	LD1AXV6_197	NSG	24/Jan/17	65,3	0	70	Horizontal. Incisiones en forma de X. Engobe rojo. Trazas de manufactura y acabado.
LD	LD1A	LD1AXV	LD1AXV6	LD1AXV6_198	NSG	24/Jan/17	16,3	0	50	
LD	LD1A	LD1AXV	LD1AXV6	LD1AXV6_200	NSG	25/Jan/17	702,8	254,8	35	1 Body incised tiene white Slip.
LD	LD1A	LD1AXV	LD1AXV6	LD1AXV6_207	NSG	24/Jan/17	0	12,6	20	Asociado a M76.
LD	LD1A	LD1AXVIa	LD1AXVIa5	LD1AXVIa5_204	NSG	26/Jan/17	0	15	15	
LD	LD1A	LD1AXVII	LD1AXVII6	LD1AXVII6_208	NSG	25/Jan/17	862	553,6	40	Fragmentos buenos para identificación de trazas tecnológicas, tanto en acabados como en manufactura. Distintos métodos.
LD	LD1B	LD1BII	LD1BII1	LD1BII1_25	NSG	23/Jan/17	0	73,4	2	Open body incised, la incisión al interior. La close body incised incisión al exterior.

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
LD	LD1B	LD1BIII	LD1BIII2	LD1BIII2_29	NSG	23/Jan/17	68,8	0	35	
LD	LD1B	LD1BIII	LD1BIII2	LD1BIII2_30	NSG	23/Jan/17	396,6	239	30	
LD	LD1B	LD1BV	LD1BV3	LD1BV3_39	NSG	24/Jan/17	137,9	56,7	30	Closed body ahumado con carbón.
LD	LD1B	LD1BV	LD1BV3	LD1BV3_42	NSG	24/Jan/17	13,5	0	55	Horizontal. Marcas de manufactura y acabado.
LD	LD1B	LD1BV	LD1BV3	LD1BV3_50	NSG	24/Jan/17	21,6	0	40	
LD	LD1B	LD1BV	LD1BV3	LD1BV3_78	NSG	24/Jan/17	19,8	12	20	
LD	LD1B	LD1BVI	LD1BVI3	LD1BVI3_115	NSG	24/Jan/17	115,2	36,2	30	
LD	LD1B	LD1BVI	LD1BVI3	LD1BVI3_93	NSG	24/Jan/17	51,8	33	30	
LD	LD1B	LD1BVI	LD1BVI4	LD1BVI4_104	NSG	24/Jan/17	272,5	151,8	40	Mucha diversidad de acabados y visibles trazas tecnológicas.
LD	LD1B	LD1BVI	LD1BVI4	LD1BVI4_129	NSG	25/Jan/17	112,7	104,8	40	Open Body con ahumado al interior.
LD	LD1B	LD1BVI	LD1BVI4	LD1BVI4_95	NSG	24/Jan/17	89,4	0	80	
LD	LD1B	LD1BXI	LD1BXI4	LD1BXI4_133	NSG	25/Jan/17	44,7	25,6	25	Rim/Neck w/white slip tiene pintura negra sobre blanco.
LD	LD1B	LD1BXI	LD1BXI4	LD1BXI4_135	NSG	25/Jan/17	48,7	0	80	Apliques redondos con forma de pezón, pero no puntiagudo.
LD	LD1B	LD1BXI	LD1BXI5	LD1BXI5_138	NSG	25/Jan/17	164,9	67,9	40	
LD	LD1B	LD1BXI	LD1BXI5	LD1BXI5_141	NSG	25/Jan/17	62,9	0	45	Incisiones no superpuestas. Marcas de tratado superficial.
LD	LD1B	LD1BXI	LD1BXI5	LD1BXI5_149	NSG	25/Jan/17	136,3	163	30	
LD	LD1B	LD1BXIV	LD1BXIV5	LD1BXIV5_173	NSG	25/Jan/17	13,5	0	40	Horizontal. Engobe rojo.
LD	LD1B	LD1BXIV	LD1BXIV5	LD1BXIV5_184	NSG	25/Jan/17	133,1	73,4	30	
LD	LD1B	LD1BXV	LD1BXV6	LD1BXV6_195	NSG	24/Jan/17	246	138,9	30	Distintos tipos de alteración del engobe blanco. Bolsa interesante para análisis tecnológico.
LD	LD1B	LD1BXV	LD1BXV6	LD1BXV6_199	NSG	24/Jan/17	70,2	0	100	Horizontal.
LD	LD1B	LD1BXVII	LD1BXVII6	LD1BXVII6_212	NSG	24/Jan/17	32,5	11,3	20	
LD	LD1	LD1MP	LD1MP?	LD1MP?_223	NSG	26/Jan/17	0	368,6	40	Decoración al interior con rojos y negros.
LD	LD1	LD1P	LD1P?	LD1P?_225	NSG	26/Jan/17	10	352,6	25	
LD	LD1	LD1XVII	LD1XVII7	LD1XVII7_214	NSG	25/Jan/17	717,3	454	30	Uno de los fragmentos tiene restos de carbón en el interior.
LD	LD1	LD1XVII	LD1XVII7	LD1XVII7_216	NSG	24/Jan/17	17,5	0	30	Forma redondeada y fragmentada (se ve el interior)
LD	LD1	LD1XVII	LD1XVII7	LD1XVII7_217	NSG	25/Jan/17	799,6	439,3	30	
LD	LD1	LD1XX	LD1XX7	LD1XX7_221	NSG	24/Jan/17	150	193,7	25	
LD	LD2	LD2H	LD2H1	LD2H1_1	NRD	11/Jan/17	8,5	0	15	
LD	LD2	LD2I	LD2I1	LD2I1_3	NRD	11/Jan/17	27,5	37,5	25	
LD	LD2	LD2II	LD2II2	LD2II2_10	NRD	11/Jan/17	610	599	30	Rim-neck inciso con engobe rojo.Base anular.
LD	LD2	LD2II	LD2II2	LD2II2_12	NRD	11/Jan/17	279	233,5	30	
LD	LD2	LD2II	LD2II2	LD2II2_13	NRD	11/Jan/17	11	0	45	Perforaciones bastante caóticas.
LD	LD2	LD2II	LD2II2	LD2II2_14	NRD	11/Jan/17	65	56	25	
LD	LD2	LD2II	LD2II2	LD2II2_6	NRD	11/Jan/17	217,5	241,5	25	
LD	LD2	LD2III	LD2III3	LD2III3_17	NRD	11/Jan/17	6,1	0	20	
LD	LD2	LD2III	LD2III3	LD2III3_18	NRD	11/Jan/17	773	626	35	Muchos engobes rojos. Chipotes de engobe alrededor de inclsiones.
LD	LD2	LD2III	LD2III3	LD2III3_21	NRD	10/Jan/17	471	236	35	Base anular, engobe que se desvanece.
LD	LD2	LD2III3_22	LD2III3	LD2III3_22	NRD	11/Jan/17	0,1	0	5	
LD	LD2	LD2III	LD2III3	LD2III3_24	NRD	11/Jan/17	885	553,4	35	Algunos rim-necks incisos tienen engobe al interior y franja roja en el labio al exterior. Bases anulares.
LD	LD2	LD2III	LD2III3	LD2III3_28	NRD	11/Jan/17	923	764,8	30	
LD	LD2	LD2III	LD2III3	LD2III3_29	NRD	11/Jan/17	0,1	0	5	
LD	LD2	LD2III	LD2III3	LD2III3_33	NRD	11/Jan/17	1309	1057	35	Muchos engobes rojos. Engobe rojo al interior de los bordes incisos.
LD	LD2	LD2III	LD2III3	LD2III3_34	NRD	10/Jan/17	45,5	0	80	
LD	LD2	LD2III	LD2III3	LD2III3_35	NRD	11/Jan/17	37,5	0	80	
LD	LD2	LD2III	LD2III3	LD2III3_36	NRD	10/Jan/17	65,3	0	95	

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
LD	LD2	LD2III	LD2III3	LD2III3_37	NRD	11/Jan/17	37,4	0	75	Ahumado al interior.
LD	LD2	LD2III	LD2III3	LD2III3_38	NRD	11/Jan/17	103,7	0	115	
LD	LD2	LD2III	LD2III3	LD2III3_39	NRD	10/Jan/17	40	0	80	
LD	LD2	LD2III	LD2III3	LD2III3_40	NRD	10/Jan/17	77,3	0	90	
LD	LD2	LD2III	LD2III3	LD2III3_41	NRD	10/Jan/17	50,2	0	85	
LD	LD2	LD2III	LD2III3	LD2III3_42	NRD	10/Jan/17	128,5	0	105	
LD	LD2	LD2III	LD2III3	LD2III3_43	NRD	10/Jan/17	66,6	0	80	
LD	LD2	LD2III	LD2III3	LD2III3_44	NRD	10/Jan/17	36,2	0	70	
LD	LD2	LD2III	LD2III3	LD2III3_45	NRD	10/Jan/17	20,3	0	45	
LD	LD2	LD2III	LD2III3	LD2III34_23	NRD	10/Jan/17	33	0	105	
LD	LD2	LD2III	LD2III4	LD2III4_46	NRD	10/Jan/17	916,1	799,2	30	Base anulares.
LD	LD2	LD2IV	LD2IV2	LD2IV2_20	NRD	11/Jan/17	101,4	85,5	35	
LD	LD2	LD2IV	LD2IV2	LD2IV2_48	NRD	11/Jan/17	21,5	6	30	
LD	LD2	LD2IV	LD2IV2	LD2IV2_54	NRD	11/Jan/17	459,5	517	30	Ojo grano de café. Engobe rojo en los rim-necks incisos.
LD	LD2	LD2IV	LD2IV4	LD2IV4_52	NRD	10/Jan/17	892,4	1201,2	35	Rim-neck incisos tienen engobe rojo al interior. Bases anulares.
LD	LD2	LD2IX	LD2IX4	LD2IX4_66	NRD	10/Jan/17	383,9	341,8	30	Ahumados, bases anulares, engobes blancos y de varios colores, pinturas.
LD	LD2	LD2IX	LD2IX4	LD2IX4_88	NRD	10/Jan/17	563,5	0	60	
LD	LD2	LD2IX	LD2IX4	LD2IX4_89	NRD	10/Jan/17	304,3	352	35	
LD	LD2	LD2VII	LD2VII2	LD2VII2_75	NRD	11/Jan/17	2151	2684,3	40	Pintura negra, ahumados al interior, ollas grandes. Bases anulares.
LD	LD2	LD2VIII	LD2VIII3	LD2VIII3_59	NRD	10/Jan/17	81,9	0	90	
LD	LD2	LD2VIII	LD2VIII3	LD2VIII3_60	NRD	10/Jan/17	60,7	0	10	
LD	LD2	LD2VIII	LD2VIII3	LD2VIII3_61	NRD	10/Jan/17	78,1	0	80	Base anular.
LD	LD2	LD2VIII	LD2VIII3	LD2VIII3_62	NRD	11/Jan/17	118,7	0	110	Ahumada al exterior.
LD	LD2	LD2VIII	LD2VIII3	LD2VIII3_63	NRD	10/Jan/17	54,5	0	85	
LD	LD2	LD2VIII	LD2VIII3	LD2VIII3_64	NRD	11/Jan/17	90,8	0	90	
LD	LD2	LD2VIII	LD2VIII4	LD2VIII4_70	NRD	10/Jan/17	744	789,5	35	Bases anulares, engobe negro.
LD	LD2	LD2VIIIa	LD2VIIIa3	LD2VIIIa3_136	NRD	11/Jan/17	23,5	0	55	
LD	LD2	LD2VIIIa	LD2VIIIa3	LD2VIIIa3_87	NRD	10/Jan/17	350	254,6	35	
LD	LD2	LD2VIIIa	LD2VIIIa4	LD2VIIIa4_104	NRD	10/Jan/17	224	100	35	Ángulo de silueta compuesta abierto. Rim-neck grande con chipote.
LD	LD2	LD2VIIIa	LD2VIIIa4	LD2VIIIa4_68	NRD	10/Jan/17	706	524	30	Bases anulares. Incisiones con herramientas varias, peines, palos, hueso?, chert?
LD2	LD2	LD2VIIIa	LD2VIIIa4	LD2VIIIa4_73	NRD	10/Jan/17	769	626	30	Bases anulares. Engobes que se desvanecen confunden con engobe blanco.
LD	LD2	LD2VIIIa	LD2VIIIa4	LD2VIIIa4_92	NRD	10/Jan/17	316,7	136	40	Ahumados al interior.
LD	LD2	LD2VIIIa	LD2VIIIa4	LD2VIIIa4_93	NRD	10/Jan/17	699	300	35	
LD	LD2	LD2X	LD2X3	LD2X3_81	NRD	11/Jan/17	942,3	601,7	35	Pintura negra soble blanca. Bases anulares abiertas y cerradas.
LD	LD2	LD2X	LD2X3	LD2X3_84	NRD	10/Jan/17	506	471,6	35	Base anular.
LD	LD2	LD2XII	LD2XII4	LD2XII4_86	NRD	10/Jan/17	1109,7	807,4	35	Ahumados, cambian los engobes blancos, hay variabilidad y pintura. Black paint. Bases anulares.
LD	LD2	LD2XII	LD2XII4	LD2XII4_94	NRD	10/Jan/17	2080,4	1777,4	40	Cuerpo con appliqué y cepillado. Bases anulares.
LD	LD2	LD2XII	LD2XII4	LD2XII4_96	NRD	10/Jan/17	1654,5	1194,3	40	Base anular, ahumados.
LD	LD2	LD2XII	LD2XII4	LD2XII4_99	NRD	11/Jan/17	7,5	0	30	
LD	LD2	LD2XII	LD2XII5	LD2XII5_102	NRD	10/Jan/17	659	519	30	Los rim/neck cerrados incisos tienen engobe al interior. Bases anulares. Engobes blancos que tienen apariencia grisásea.
LD	LD2	LD2XII	LD2XII5	LD2XII5_109	NRD	17/Jan/17	346,5	144,3	35	Rim-neck incised red.
LD	LD2	LD2XII	LD2XII5	LD2XII5_111	NRD	10/Jan/17	656,2	491,5	30	Base anular, menos incisos.
LD	LD2	LD2XII	LD2XII5	LD2XII5_113	NRD	17/Jan/17	60	0	30	

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
LD	LD2	LD2XII	LD2XII5	LD2XII5_114	NRD	17/Jan/17	61,8	0	80	Double orange band parallel to rim (2nd on lip). Outside, same but brown inside. Brown/orange/white
LD	LD2	LD2XII	LD2XII5	LD2XII5_115	NRD	17/Jan/17	470,7	164,2	30	Parecido a LP pero con cosas de Carca.
LD	LD2	LD2XII	LD2XII5	LD2XII5_116	NRD	17/Jan/17	30,5	0	65	Engobe rojo sobre naranja al interior.
LD	LD2	LD2XII	LD2XII5	LD2XII5_117	NRD	17/Jan/17	71,3	0	65	Incised outside, red/white inside
LD	LD2	LD2XII	LD2XII5	LD2XII5_118	NRD	17/Jan/17	67	0	75	
LD	LD2	LD2XII	LD2XII5	LD2XII5_119	NRD	17/Jan/17	31,8	0	45	Cajete curvo divergente
LD	LD2	LD2XVI	LD2XVI5	LD2XVI5_121	NRD	10/Jan/17	1370	894,2	30	Bases anulares.
LD	LD2	LD2XVI	LD2XVI6	LD2XVI6_124	NRD	17/Jan/17	110,3	18,8	25	Rim-neck appliqué con impresiones.
LD	LD2	LD2XVI	LD2XVI6	LD2XVI6_127	NRD	17/Jan/17	1155	469,3	30	Ahumados alinterior, engobes blancos, negro/blanco, café/blanco. Double line incised parallel to lip.
LD	LD2	LD2XVI	LD2XVI6	LD2XVI6_131	NRD	17/Jan/17	25,8	0	35	
LD	LD2	LD2XVIII	LD2XVIII7	LD2XVIII7_132	NRD	17/Jan/17	383,7	101	30	Shoulder-neck con pintura negra en el neck.
LD	LD2	LD2XVIII	LD2XVIII7	LD2XVIII7_137	NRD	09/Jan/17	23	0	20	
LP	LPT3	LPT3D	LPT3DP	LPT3DP_1319	NRD	09/Jan/17	413	0	55	Ask for contextual information, layer was labeled as deep? And level as posthole. Body acanalado y perforado.
LP	LPT3	LPT3F4	LPT3F4	LPT3F4_250	NRD	13/Jan/17	1968,8	0	100	
LP	LPT3	LPT3F4	LPT3F46	LPT3F46_348	NRD	13/Jan/17	44,5	0	45	
LP	LPT3	LPT3I	LPT3I2	LPT3I2_48	NRD	09/Jan/17	198,5	97,8	35	Base anular.
LP	LPT3	LPT3I	LPT3I3	LPT3I3_92	NRD	09/Jan/17	1237,3	565	35	Bases anulares, posible plato, ahumados al interior.
LP	LPT3	LPT3I	LPT3I4	LPT3I4_212	NRD	09/Jan/17	2845	1044	40	Bases anulares, ahumados al interior.
LP	LPT3	LPT3II	LPT3II4	LPT3II4_184	NRD	09/Jan/17	3233	1180	40	Ahumados, bases anulares.
LP	LPT3	LPT3II	LPT3II5	LPT3II5_310	NRD	09/Jan/17	1462	753,6	40	Un borde parece de plato.
				LPT3II5_310(2)	NRD	09/Jan/17	1274,7	154,3	45	Cepillados e incisiones. Bases anulares.
LP	LPT3	LPT3II	LPT3II5	LPT3II5_312	NRD	09/Jan/17	1132	360	35	Base anular.
LP	LPT3	LPT3II	LPT3II5-6	LPT3II5-6_356	NRD	09/Jan/17	323,8	17,8	25	
LP	LPT3	LPT3III	LPT3III6	LPT3III6_402	NRD	09/Jan/17	517,3	256,2	30	Bastante cepillado y variedades de incisos. El malacate está inciso, sólido. El shoulder con appliqué tiene impresiones de herramienta encima. Base anular.
LP	LPT3	LPT3III	LPT3III7	LPT3III7_372	NRD	10/Jan/17	466,5	177	30	Algunos "abiertos" pueden ser en realidad cerrados con
LP	LPT3	LPT3III	LPT3III8	LPT3III8_390	NRD	09/Jan/17	35,3	0	25	Buena conservación a pesar de ser el nivel inferior.
LV	LV1	LV1I	LV1I2	LV1I2_3	YC	29/Nov/16	325,5	312,6	30	
LV	LV1	LV1II	LV1II2	LV1II2_10	NRD	17/Jan/17	1416,5	1044,8	30	Cerrados overfired, esgrafiados e incisos (feos), casi no hay engobe blanco, no hay xúmitles.
LV	LV1	LV1II	LV1II2	LV1II2_11	YC	29/Nov/16	1115,3	748,7	30	
LV	LV1	LV1II	LV1II2	LV1II2_17	NRD	30/Dec/16	557,3	347,8	30	
LV	LV1	LV1III	LV1III2	LV1III2_19	NRD	17/Jan/17	196	92,6	30	
LV	LV1	LV1III	LV1III3	LV1III3_28	NRD	17/Jan/17	976	427	30	
LV	LV1	LV1VI	LV1VI6	LV1III3_29	NRD	17/Jan/17	479,7	300,2	30	
LV	LV1	LV1VI	LV1VI3	LV1VI3_42	NRD	17/Jan/17	1330,8	593	35	Ahumados interior, platos?, más formas cerradas que en AB.
LV	LV1	LV1VI	LV1VI3	LV1VI3_43	NRD	17/Jan/17	74,2	0	20	
LV	LV1	LV1VI	LV1VI4	LV1VI4_54	NRD	17/Jan/17	95,5	11,3	25	
LV	LV1	LV1VI	LV1VI5	LV1VI5_47	NRD	17/Jan/17	56,3	20	30	
LV	LV1	LV1VI	LV1VI6	LV1VI6_48	NRD	17/Jan/17	11,7	0	25	
LV	LV2	LV2II	LV2II2	LV2II2_14	NRD	17/Jan/17	51,1	16,2	25	
LV	LV2	LV2IV	LV2IV3	LV2IV3_24	NRD	17/Jan/17	56,4	59,7	25	Se ve diferente al nivel inferior.
LV	LV2	LV2V	LV2V4	LV2V4_36	NRD	17/Jan/17	654,3	557,5	30	
LV	LV2	LV2VI	LV2VI5	LV2VI5_39	NRD	17/Jan/17	282,1	132,4	30	More eroded than unit 1 materials.
LVA	LVA1	LVA1I	LVA1I1	LVA1I1_3	NRD	13/Jan/17	11,2	11,2	25	

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
LVA	LVA2	LVA2II	LVA2II2	LVA2II2_9	NRD	13/Jan/17	3,3	0	20	
LVA	LVA2	LVA2S	LVA2S?	LVA2S?_7	NRD	13/Jan/17	55,7	0	70	Soporte anular?
LVA	LVA3	LVA3I	LVA3I1	LVA3I1_10	NRD	13/Jan/17	33,8	0	55	
LVA	LVA3	LVA3I	LVA3I1	LVA3I1_12	NRD	13/Jan/17	10,7	0	30	
LVA	LVA4	LVA4II	LVA4II2	LVA4II2_24	NRD	13/Jan/17	2,6	0	20	
LVA	LVA4	LVA4II	LVA4II3	LVA4II3_26	NRD	13/Jan/17	24,6	0	20	
OP	OP1A	OP1A?	OP1A??	OP1A??_148	NRD	06/Jan/17	0	5,1	20	
OP	OP1A	OP1A?	OP1A?4-6	OP1A?4-6_114	NRD	07/Jan/17	0	17,3	20	
OP	OP1A	OP1AH	OP1AH3	OP1AH3	NRD	06/Jan/17	0	6,7	20	
OP	OP1A	OP1AII/III	OP1AII/III4	OP1AII/III4_80	NRD	06/Jan/17	15,2	5,6	20	
OP	OP1A	OP1AII	OP1AII3	OP1AII3_198	NRD	06/Jan/17	0	9,3	25	
OP	OP1A	OP1AII	OP1AII4	OP1AII4_15	NRD	06/Jan/17	24,7	0	60	
OP	OP1A	OP1AII	OP1AII4	OP1AII4_18	NRD	06/Jan/17	33,4	0	50	La base tiene cicatriz de soporte.
OP	OP1A	OP1AII	OP1AII4	OP1AII4_19	NRD	06/Jan/17	2	0	20	
OP	OP1A	OP1AIII	OP1AIII4	OP1AII4_20	NRD	06/Jan/17	2,4	0	20	Engobe rojo.
OP	OP1A	OP1AII	OP1AII4	OP1AII4_21	NRD	06/Jan/17	7,6	7,3	20	
OP	OP1A	OP1AII	OP1AII4	OP1AII4_3	NRD	06/Jan/17	51,4	12,3	30	
OP	OP1A	OP1AII	OP1AII4	OP1AII4_31	NRD	06/Jan/17	22,1	45,3	20	
OP	OP1A	OP1AII	OP1AII4	OP1AII4_4	NRD	06/Jan/17	39,4	0	40	
OP	OP1A	OP1AII	OP1AII4	OP1AII4_40	NRD	06/Jan/17	36,5	20	20	Soporte botón
OP	OP1A	OP1AII	OP1AII4	OP1AII4_43	NRD	06/Jan/17	23,5	0	20	
OP	OP1A	OP1AII	OP1AII4	OP1AII4_45	NRD	06/Jan/17	6	0	35	
OP	OP1A	OP1AII	OP1AII4	OP1AII4_46	NRD	06/Jan/17	13,4	0	50	
OP	OP1A	OP1AII	OP1AII4	OP1AII4_6	NRD	06/Jan/17	13	0	30	
OP	OP1A	OP1A	OP1AII4-5	OP1AII4-5_197	NRD	06/Jan/17	48,1	12,1	30	
OP	OP1A	OP1AII	OP1AIIA4	OP1AIIA4_62	NRD	06/Jan/17	184,4	36,2	30	
OP	OP1A	OP1AIIB	OP1AIIB4-5	OP1AIIB4-5_65	NRD	06/Jan/17	12,9	15,7	30	
OP	OP1A	OP1AIII	OP1AIII4	OP1AIII4_10	NRD	06/Jan/17	22	0	55	
OP	OP1A	OP1AIII	OP1AIII4	OP1AIII4_11	NRD	06/Jan/17	1,3	0	15	
OP	OP1A	OP1AIII	OP1AIII4	OP1AIII4_113	NRD	06/Jan/17	6,6	0	20	
OP	OP1A	OP1AIII	OP1AIII4	OP1AIII4_13	NRD	06/Jan/17	10,9	14,3	20	
OP	OP1A	OP1AIII	OP1AIII4	OP1AIII4_26	NRD	06/Jan/17	2,6	0	20	
OP	OP1A	OP1AIII	OP1AIII4	OP1AIII4_27	NRD	06/Jan/17	14,4	4	20	El borde tiene impresiones.
OP	OP1A	OP1AIII	OP1AIII4	OP1AIII4_32	NRD	06/Jan/17	86,3	59,4	30	
OP	OP1A	OP1AIII	OP1AIII4	OP1AIII4_36	NRD	06/Jan/17	33,5	0	65	
OP	OP1A	OP1AIII	OP1AIII4	OP1AIII4_37	NRD	06/Jan/17	34,1	0	60	
OP	OP1A	OP1AIII	OP1AIII4	OP1AIII4_38	NRD	06/Jan/17	4,3	0	20	
OP	OP1A	OP1AIII	OP1AIII4	OP1AIII4_48	NRD	06/Jan/17	121,1	0	90	
OP	OP1A	OP1AIII	OP1AIII4	OP1AIII4_8	NRD	06/Jan/17	2	0	25	
OP	OP1A	OP1AIII	OP1AIII5	OP1AIII5_52	NRD	06/Jan/17	49,4	0	20	Un cuerpo tiene impresiones.
OP	OP1A	OP1AIII	OP1AIII5	OP1AIII5_54	NRD	06/Jan/17	73,4	44,7	30	Un cuepo tiene impresiones.
OP	OP1A	OP1AIII	OP1AIII5	OP1AIII5_56	NRD	06/Jan/17	20	0	50	
OP	OP1A	OP1AIII	OP1AIII5	OP1AIII5_57	NRD	06/Jan/17	16,7	0	45	
OP	OP1A	OP1AIII	OP1AIII5	OP1AIII5_61	NRD	06/Jan/17	17,9	0	40	Asa "aplastada" como en la unidad anterior.
OP	OP1A	OP1AIIIA	OP1AIIIA4-5	OP1AIIIA4-5_66	NRD	06/Jan/17	100,5	58,3	30	
OP	OP1A	OP1AVII	OP1AVII5	OP1AVII5_72	NRD	06/Jan/17	22,2	0	30	
OP	OP1A	OP1AVII	OP1AVII5	OP1AVII5_74	NRD	06/Jan/17	13,4	0	55	
OP	OP1A	OP1AVII	OP1AVII5	OP1AVII5_77	NRD	06/Jan/17	9	0	25	
OP	OP1A	OP1AVII	OP1AVII5	OP1AVII5_78	NRD	06/Jan/17	37,5	0	60	Ahumado al interior.
OP	OP1A	OP1AVII	OP1AVII5	OP1AVII5_85	NRD	06/Jan/17	189,4	96	25	Un borde tiene pintura negra.
OP	OP1A	OP1AVII	OP1AVII7	OP1AVII7_110	NRD	06/Jan/17	12,5	0	30	
OP	OP1A	OP1AVIIM	OP1AVIIM5	OP1AVIIM5_169	NRD	06/Jan/17	263,5	106	30	
OP	OP1A	OP1AX	OP1AX5	OP1AX5_93	NRD	06/Jan/17	12,3	0	25	
OP	OP1A	OP1AX	OP1AX5	OP1AX5_97	NRD	06/Jan/17	6,3	0	15	Tiene huella de haber estado incrustada con un palito.
OP	OP1A	OP1AX	OP1AX5	OP1AX5_98	NRD	06/Jan/17	20,3	5,7	20	
OP	OP1A	OP1AX	OP1AX5	OP1AX5-8_199	NRD	06/Jan/17	0	11,5	25	
OP	OP1A	OP1AX	OP1AX6	OP1AX6_102	NRD	06/Jan/17	79,5	62	25	
OP	OP1A	OP1AX	OP1AX6	OP1AX6_106	NRD	06/Jan/17	37	0	25	

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
OP	OP1B	OP1BH	OP1BH2	OP1BH2_119	NRD	06/Jan/17	14,9	12,1	30	
OP	OP1B	OP1BXIIB	OP1BXIIB2	OP1BHB2_120	NRD	06/Jan/17	0	4,7	20	
OP	OP1B	OP1BVIIM	OP1BVIIM5	OP1BVIIM5_166	NRD		16,5	0	40	
OP	OP1B	OP1BVIIM	OP1BVIIM5	OP1BVIIM5_167	NRD	06/Jan/17	36,2	0	70	
OP	OP1B	OP1BVIIM	OP1BVIIM5	OP1BVIIM5_172	NRD	06/Jan/17	156,4	0	13	
OP	OP1B	OP1BXII	OP1BXII2	OP1BXII2_122	NRD	06/Jan/17	79,3	115,1	30	
OP	OP1B	OP1BXII	OP1BXII3	OP1BXII3_132	NRD	06/Jan/17	59,6	25,7	25	
OP	OP1B	OP1BXII	OP1BXII3	OP1BXII3_139	NRD	06/Jan/17	79,1	11,6	30	Impresiones con palillo en el cuello.
OP	OP1B	OP1BXII	OP1BXII3	OP1BXII3_140	NRD	06/Jan/17	47,2	0	90	
OP	OP1B	OP1BXII	OP1BXII3	OP1BXII3_146	NRD	06/Jan/17	3,8	3	15	
OP	OP1B	OP1BXII	OP1BXII3	OP1BXII3_147	NRD	06/Jan/17	3,8	0	0,5	
OP	OP1B	OP1BXIIB	OP1BXIIB2	OP1BXIIB2_127	NRD	06/Jan/17	19	2,9	20	
OP	OP1B	OP1BXIIC	OP1BXIIC2	OP1BXIIC2_126	NRD	06/Jan/17	10,4	9,4	30	
OP	OP1B	OP1BXIX	OP1BXIX4	OP1BXIX4_152	NRD	06/Jan/17	210	116,5	30	
OP	OP1B	OP1BXM	OP1BXM6	OP1BXM6_190	NRD	06/Jan/17	25,1	3,2	20	
OP	OP1B	OP1BXM	OP1BXM6	OP1BXM6_195	NRD	06/Jan/17	5,2	0	20	Parece lítica.
OP	OP1B	OP1BXV	OP1BXV3	OP1BXV3_134	NRD	06/Jan/17	11	0	25	
OP	OP1B	OP1BXX	OP1BXX4	OP1BXX4_157	NRD	06/Jan/17	30,5	0	30	
OP	OP1B	OP1BXX	OP1BXX4	OP1BXX4_159	NRD	06/Jan/17	194,6	0	50	
OP	OP1B	OP1BXX	OP1BXX4	OP1BXX4_163	NRD	06/Jan/17	24,5	0	50	
OP	OP1B	OP1BXXI	OP1BXXI5	OP1BXXI5_176	NRD	06/Jan/17	80,5	20,7	25	Ahumados al interior. El inciso va sobre el appliqué.
OP	OP1B	OP1BXXI	OP1BXXI5	OP1BXXI5_184	NRD	06/Jan/17	43,7	23,6	30	
OP	OP1B	OP1BXXIA	OP1BXXIA5	OP1BXXIA5_185	NRD	06/Jan/17	28	3,8	20	Un tiesto parece estar sobrecocido.
OP	OP2	OP2?	OP2??	OP2??_74	NRD	05/Jan/17	2,1	2,7	20	
OP	OP2	OP2H	OP2H1	OP2H1_3	NRD	06/Jan/17	0	6,1	20	
OP	OP2	OP2I	OP2I1	OP2I1_6	NRD	06/Jan/17	0	9,7	20	
OP	OP2	OP2I	OP2I1	OP2I1_8	NRD	06/Jan/17	85	43,8	30	Base aparentemente anular. El cuello tiene un rollo aplicado y luego impresiones.
OP	OP2	OP2IA	OP2IA2	OP2IA2_39	NRD	05/Jan/17	0	9,5	25	Cepillado
OP	OP2	OP2IC	OP2IC2	OP2IC2_19	NRD	05/Jan/17	12,2	0	20	
OP	OP2	OP2IE	OP2IE2	OP2IE2_21	NRD	05/Jan/17	80,2	23,5	0	
OP	OP2	OP2IF	OP2IF2	OP2IF2_42	NRD	05/Jan/17	36	0	30	
OP	OP2	OP2IF	OP2IF2	OP2IF2_63	NRD	05/Jan/17	0	1	15	
OP	OP2	OP2IH/K	OP2IH/K1	OP2IH/K1_61	NRD	06/Jan/17	0	2	15	
OP	OP2	OP2IX	OP2IX2	OP2IX2_52	NRD	05/Jan/17	30,8	0	60	
OP	OP2	OP2VIII	OP2VIII2	OP2IX3_50	NRD	05/Jan/17	49,7	0	70	
OP	OP2	OP2IX	OP2IX3	OP2IX3_57	NRD	05/Jan/17	7,2	0	25	
OP	OP2	OP2IX	OP2IX3	OP2IX3_58	NRD	05/Jan/17	7,7	0	35	
OP	OP2	OP2IX	OP2IX3	OP2IX3_60	NRD	05/Jan/17	38,6	18,7	20	Pintura negra.
OP	OP2	OP2IX	OP2IX3	OP2IX3_66	NRD	05/Jan/17	138	63,7	30	La base abierta es un plato con soporte de botón. Los bordes cerrados tienen el exterior excavado o impresiones con palitos.
OP	OP2	OP2SIH/K	OP2SIH/K2	OP2SIH/K2_41	NRD	05/Jan/17	0	14,8	25	
OP	OP2	OP2SIH/K	OP2SIH/K2	OP2SIH/K2_43	NRD	05/Jan/17	29,2	0	45	
OP	OP2	OP2V	OP2V?	OP2V?_28	NRD	05/Jan/17	71,2	51,6	30	
OP	OP2	OP2V	OP2V1	OP2V1_10	NRD	06/Jan/17	8,6	0	40	
OP	OP2	OP2V	OP2V1	OP2V1_11	NRD	06/Jan/17	6,1	0	35	
OP	OP2	OP2V	OP2V1	OP2V1_12	NRD	06/Jan/17	20,6	0	35	
OP	OP2	OP2V	OP2V1	OP2V1_13	NRD	06/Jan/17	0	5,5	25	
OP	OP2	OP2V	OP2V1	OP2V1_14	NRD	06/Jan/17	30	0	55	
OP	OP2	OP2V	OP2V1	OP2V1_16	NRD	06/Jan/17	582	444,1	30	Cuello con impresiones. Impresiones en los bordes y cuellos. Vasijas miniaturas
OP	OP2	OP2V	OP2V1	OP2V1_24	NRD	06/Jan/17	358,3	120,6	30	Hay decoraciones con impresiones.
OP	OP2	OP2V	OP2V2	OP2V2_25	NRD	06/Jan/17	224,7	183,1	25	Uno de los bordes tiene impresiones al exterior.
OP	OP2	OP2VI	OP2VI1	OP2VI1_29	NRD	06/Jan/17	34	0	50	
OP	OP2	OP2VI	OP2VI2	OP2VI2_31	NRD	05/Jan/17	51,6	28,1	30	Rim/neck with chipote appliqué.

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
OP	OP2	OP2VI	OP2VI2	OP2VI2_34	NRD	05/Jan/17	57,2	0	55	
OP	OP2	OP2VIII	OP2VIII2	OP2VIII2_44	NRD	05/Jan/17	55,7	0	75	
OP	OP2	OP2VIII	OP2VIII2	OP2VIII2_45	NRD	05/Jan/17	22,5	0	55	Tres líneas incisas
OP	OP2	OP2VIII	OP2VIII2	OP2VIII2_46	NRD	05/Jan/17	17,7	0	35	Double black line outside.
OP	OP2	OP2VIII	OP2VIII2	OP2VIII2_47	NRD	06/Jan/17	632	236,7	30	Uno de los hombros tiene impresiones en el empate con el cuerpo, que probablemente continúa en el cuello.
OP	OP2	OP2VIII	OP2VIII2	OP2VIII2_51	NRD	05/Jan/17	41	48,3	25	Rojo sobre blanco.
OP	OP2	OP2VIII	OP2VIII2	OP2VIII2_54	NRD	05/Jan/17	13,3	0	45	
OP	OP2	OP2VIII	OP2VIII2	OP2VIII2_55	NRD	05/Jan/17	9,7	0	35	
OP	OP2	OP2XI	OP2XI3	OP2XI3_70	NRD	05/Jan/17	9,5	9,9	0	
OP	OP2	OPIB	OPIB2	OPIB2_40	NRD	05/Jan/17	0	2,6	20	
QP	QP1	QP1I	QP1I4	QP1I4_?	NRD	13/Jan/17	39	0	25	
QP	QP1	QP1Ia	QP1Ia4	QP1Ia4_3	NRD	13/Jan/17	16	0	20	
QP	QP1	QP1IB	QP1IB5	QP1IB5_40	NRD	13/Jan/17	0,5	0	10	
QP	QP1	QP1V	QP1V4	QP1V4_10	NRD	13/Jan/17	20	0	45	
QP	QP1	QP1V	QP1V4	QP1V4_11	NRD	13/Jan/17	29,5	0	20	
QP	QP1	QP1V	QP1V4	QP1V4_15	NRD	13/Jan/17	33,7	0	40	
QP	QP1	QP1V	QP1V4	QP1V4_17	NRD	13/Jan/17	7,6	0	25	
QP	QP1	QP1V	QP1V4	QP1V4_20	NRD	13/Jan/17	57,5	0	80	Con reborde.
QP	QP1	QP1V	QP1V4	QP1V4_24	NRD	13/Jan/17	16,5	0	35	
QP	QP1	QP1V	QP1V4	QP1V4_29	NRD	13/Jan/17	7	0	25	
QP	QP1	QP1V	QP1V4	QP1V4_30	NRD	13/Jan/17	69,5	0	20	
QP	QP1	QP1V	QP1V4	QP1V4_33	NRD	13/Jan/17	6	0	25	
QP	QP1	QP1V	QP1V4	QP1V4_35	NRD	13/Jan/17	5,5	0	35	
QP	QP1	QP1V	QP1V4	QP1V4_36	NRD	13/Jan/17	16,5	0	20	
QP	QP1	QP1V	QP1V4	QP1V4_6	NRD	13/Jan/17	33,1	0	35	
QP	QP1	QP1V	QP1V5	QP1V5_43	NRD	13/Jan/17	29,2	0	0	
QP	QP3A	QP3AII	QP3AII-4	QP3AII-4_4	NRD	13/Jan/17	1,5	0	15	
QP	QP3B	QP3BVI	QP3BVI-5	QP3BVI-5_11	NRD	13/Jan/17	1,1	0	15	
RAI	RAI1	RAI1I	RAI1I2	RAI1I2_22	NRD	12/Jan/17	63,4	29	30	Base anular.
RAI	RAI1	RAI1I	RAI1I2	RAI1I2_3	NRD	12/Jan/17	41,5	29,2	25	
RAI	RAI1	RAI1I	RAI1I2	RAI1I2_7	NRD	12/Jan/17	14,7	0	45	Base anular.
RAI	RAI1	RAI1I	RAI1I3	RAI1I3_10	NRD	12/Jan/17	46,9	0	70	
RAI	RAI1	RAI1I	RAI1I3	RAI1I3_11	NRD	12/Jan/17	428,4	242,5	30	
RAI	RAI1	RAI1I	RAI1I3	RAI1I3_8	NRD	12/Jan/17	483,1	250,4	25	
RAI	RAI1	RAI1II	RAI1II3	RAI1II3_14	NRD	12/Jan/17	436,1	178,9	30	
RAI	RAI1	RAI1II	RAI1II3	RAI1II3_19	NRD	12/Jan/17	983	565,2	30	Base anular.
RAI	RAI1	RAI1II	RAI1II3	RAI1II3_24	NRD	12/Jan/17	387,1	281,6	30	
RAI	RAI1	RAI1II	RAI1II3	RAI1II3_26	NRD	12/Jan/17	32	0	50	
RAI	RAI1	RAI1II	RAI1II3	RAI1II3_27	NRD	12/Jan/17	923,3	467,3	30	Bases anulares.
RAI	RAI1	RAI1IIa	RAI1IIa3	RAI1IIa3_30	NRD	12/Jan/17	859,5	841	30	Una base anular.
RAI	RAI1	RAI1IIa	RAI1IIa4	RAI1IIa4_34	NRD	12/Jan/17	114,7	52,7	25	
RAI	RAI1	RAI1IIa	RAI1IIa4	RAI1IIa4_38	NRD	12/Jan/17	281	133	30	
RAI	RAI1	RAI1IIa	RAI1IIa4	RAI1IIa4_74	NRD	12/Jan/17	265,6	117,2	30	Base anular.
RAI	RAI1	RAI1III	RAI1III3	RAI1III3_28	NRD	12/Jan/17	953,4	404,4	30	Bases anulares.
RAI	RAI1	RAI1III	RAI1III4	RAI1III4_40	NRD	12/Jan/17	481,4	267,5	30	
RAI	RAI1	RAI1III	RAI1III4	RAI1III4_52	NRD	12/Jan/17	294,5	170,3	30	
RAI	RAI1	RAI1III	RAI1III4	RAI1III4_64	NRD	12/Jan/17	87,3	78,7	25	
RAI	RAI1	RAI1III	RAI1III5	RAI1III5_116	NRD	11/Jan/17	21	0	30	
RAI	RAI1	RAI1III	RAI1III5	RAI1III5_33	NRD	12/Jan/17	209,4	119,2	30	
RAI	RAI1	RAI1III	RAI1III5	RAI1III5_70	NRD	11/Jan/17	21,1	0	25	
RAI	RAI1	RAI1III	RAI1III8	RAI1III8_137	NRD	11/Jan/17	2,2	0	20	
RAI	RAI1	RAI1IV	RAI1IV4	RAI1IV4_121	NRD	12/Jan/17	277	122	30	Un rim-neck parece de botella.
RAI	RAI1	RAI1IV	RAI1IV4	RAI1IV4_46	NRD	12/Jan/17	5,5	0	30	
RAI	RAI1	RAI1IV	RAI1IV4	RAI1IV4_47	NRD	12/Jan/17	3	0	30	
RAI	RAI1	RAI1IV	RAI1IV4	RAI1IV4_55	NRD	12/Jan/17	1088	574,1	30	Borde inciones paralelas y punzonado sobre el labio. Bases anulares.
RAI	RAI1	RAI1IV	RAI1IV4	RAI1IV4_58	NRD	12/Jan/17	30,5	0	55	

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
RAI	RAI1	RAI1IV	RAI1IV4	RAI1IV4_59	NRD	12/Jan/17	566,5	415,6	30	Engobe rojo al interior de los rim-necks incisos.
RAI	RAI1	RAI1IV	RAI1IV5	RAI1IV5_77	NRD	12/Jan/17	1451,2	1047	25	Muchísima fragmentación. Los materiales son vagamente parecidos a los de LP, pero hay más formas abiertas, los incisos son diferentes, hay rojo sobre blanco parecido. Rim-neck inciso con engobe rojo al interior. Doble banda roja paralela borde engobe bord
RAI	RAI1	RAI1IVa	RAI1IVa5	RAI1IVa5_106	NRD	12/Jan/17	332	156,4	30	Ahumados
RAI	RAI1	RAI1IVa	RAI1IVa5	RAI1IVa5_111	NRD	12/Jan/17	327	128	30	
RAI	RAI1	RAI1IVa	RAI1IVa6	RAI1IVa6_126	NRD	11/Jan/17	29,2	0	25	Naranja sobre blanco.
RAI	RAI1	RAI1IX	RAI1IX7	RAI1IX7_131	NRD	11/Jan/17	7,5	0	20	
RAI	RAI1	RAI1IX	RAI1IX7	RAI1IX7_138	NRD	11/Jan/17	0,4	0	10	
RAI	RAI1	RAI1V	RAI1V4	RAI1V4_119	NRD	12/Jan/17	401	184	30	
RAI	RAI1	RAI1V	RAI1V4	RAI1V4_90	NRD	12/Jan/17	220,2	102	25	
RAI	RAI1	RAI1V	RAI1V5	RAI1V5_67	NRD	12/Jan/17	382,5	306	30	Appliqué grano de café.
RAI	RAI1	RAI1V	RAI1V5	RAI1V5_99	NRD	11/Jan/17	316,5	165	25	
RAI	RAI1	RAI1VI	RAI1VI5	RAI1VI5_96	NRD	12/Jan/17	369,5	212,5	30	Uno de los body white slip tiene una perforción cónica. Base anular
RAI	RAI1	RAI1VIII	RAI1VIII5	RAI1VIII5_103	NRD	11/Jan/17	85,3	0	25	Rojo sobre blanco.
RAI	RAI1	RAI1VIII	RAI1VIII5	RAI1VIII5_113	NRD	11/Jan/17	70,3	0	25	
RAI	RAI1	RAI1VIII	RAI1VIII6	RAI1VIII6_124	NRD	11/Jan/17	22,9	0	20	
RAI	RAI1	RAI1VIII	RAI1VIII7	RAI1VIII7_129	NRD	11/Jan/17	9,7	0	20	
RAI	RAI1	RAI1VIII	RAI1VIII8	RAI1VIII8_134	NRD	11/Jan/17	6,2	0	15	
RAI	RAI1	RAI1VIII	RAI1VIII9	RAI1VIII9_136	NRD	11/Jan/17	3	0	10	
RDO	RDO1A	RDO1AV	RDO1AV3	RDO1AV3_2	NRD	05/Jan/17	0	46,8	40	
RDO	RDO1A	RDO1AV	RDO1AV4	RDO1AV4_4	NRD	05/Jan/17	0	1,6	20	
RDO	RDO1A	RDO1AVA	RDO1AVA4	RDO1AVA4_7	NRD	05/Jan/17	20,1	10,3	30	
RDO	RDO1A	RDO1AVA	RDO1AVA5	RDO1AVA5_10	NRD	05/Jan/17	44,4	27,4	30	
RDO	RDO1A	RDO1AVA	RDO1AVA5	RDO1AVA5_9	NRD	05/Jan/17	33,4	0	70	
RDO	RDO1A	RDO1AVII	RDO1AVII6	RDO1AVII6_15	NRD	05/Jan/17	2,6	0	20	
RDO	RDO1A	RDO1AX	RDO1AX3	RDO1AX3_17	NRD	05/Jan/17	0	3,8	20	
RDO	RDO1B	RDO1BX	RDO1BX2	RDO1BX2_19	NRD	05/Jan/17	15,6	0	40	
RDO	RDO1B	RDO1BX	RDO1BX2	RDO1BX2_20	NRD	05/Jan/17	0	14,4	20	
RDO	RDO1B	RDO1BXI	RDO1BXI3	RDO1BXI3_21	NRD	05/Jan/17	0	6,9	30	Too eroded to sample.
RDO	RDO1B	RDO1BXI	RDO1BXI3	RDO1BXI3_22	NRD	05/Jan/17	4,8	1,6	20	
RDO	RDO1B	RDO1BXI	RDO1BXI4	RDO1BXI4_23	NRD	05/Jan/17	97,3	10,9	40	
RDO	RDO1B	RDO1BXI	RDO1BXI4	RDO1BXI4_25	NRD	05/Jan/17	0	5,1	20	
RDO	RDO1B	RDO1BXI	RDO1BXI4	RDO1BXI4_31	NRD	05/Jan/17	14,4	0	45	
RDO	RDO1B	RDO1BXII	RDO1BXII4	RDO1BXII4_4	NRD	05/Jan/17	0,8	0	30	
RDO	RDO1B	RDO1BXII	RDO1BXII4	RDO1BXII4_40	NRD	05/Jan/17	0	6,1	25	
RDO	RDO1B	RDO1BXII	RDO1BXII4	RDO1BXII4_47	NRD	05/Jan/17	19	29,3	25	
RDO	RDO1B	RDO1BXII	RDO1BXII5	RDO1BXII5_54	NRD	05/Jan/17	12,1	0	50	
RDO	RDO1B	RDO1BXII	RDO1BXII5	RDO1BXII5_57	NRD	05/Jan/17	21,3	0	40	
RDO	RDO1B	RDO1BXII	RDO1BXII5	RDO1BXII5_58	NRD	05/Jan/17	6,8	0	25	
RDO	RDO1B	RDO1BXII	RDO1BXII5	RDO1BXII5_59	NRD	05/Jan/17	15,5	0	45	
RDO	RDO1B	RDO1BXV	RDO1BXV	RDO1BXV_37	NRD	05/Jan/17	4,2	0	25	
RDO	RDO1B	RDO1BXV	RDO1BXV4	RDO1BXV4_29	NRD	05/Jan/17	0	22,4	30	
RDO	RDO1B	RDO1BXV	RDO1BXV4	RDO1BXV4_32	NRD	05/Jan/17	35,9	29,9	30	
RDO	RDO1B	RDO1BXV	RDO1BXV4	RDO1BXV4_39	NRD	05/Jan/17	0	5,1	35	
RDO	RDO1B	RDO1BXV	RDO1BXV4	RDO1BXV4_41	NRD	05/Jan/17	18,6	0	60	
RDO	RDO1B	RDO1BXV	RDO1BXV4	RDO1BXV4_42	NRD	05/Jan/17	31,5	0	65	
RDO	RDO1B	RDO1BXV	RDO1BXV4	RDO1BXV4_43	NRD	05/Jan/17	5,5	0	25	Decorado con impresiones al exterior.
RDO	RDO1B	RDO1BXV	RDO1BXV5	RDO1BXV5_53	NRD	05/Jan/17	42,9	39,8	30	
RDO	RDO1B	RDO1BXVII	RDO1BXVII5	RDO1BXVII5_55	NRD	05/Jan/17	19,4	0	30	Un cuerpo está ahumado al interior.
RDO	RDO1B	RDO1BXVII	RDO1BXVII5	RDO1BXVII5_61	NRD	05/Jan/17	41,4	0	0	
RDO	RDO1B	RDO1BXVII	RDO1BXVII6	RDO1BXVII6_62	NRD	05/Jan/17	23,7	0	45	
RDO	RDO1B	RDO1BXVII	RDO1BXVII8	RDO1BXVII8_66	NRD	05/Jan/17	6,9	0	40	
RDO	RDO1	RDO1V	RDO1V4	RDO1V4_5	NRD	05/Jan/17	0	6	15	

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
RDO	RDO1	RDO1XVII	RDO1XVII5	RDO1XVII5_60	NRD	05/Jan/17	28	0	60	
RDO	RDO2	RDO2H	RDO2H1	RDO2H1_2	NRD	05/Jan/17	0	4,5	20	
RDO	RDO2	RDO2I	RDO2I1	RDO2I1_4	NRD	05/Jan/17	332,5	206,3	30	Soportes miniatura semi cónicos. Borde con decoración de impresiones al exterior.
RDO	RDO2	RDO2I	RDO2I2	RDO2I2_13	NRD	05/Jan/17	3,2	0	20	
RDO	RDO2	RDO2I	RDO2I2	RDO2I2_5	NRD	05/Jan/17	81,2	41,2	20	Aplique en el borde de chipotito, soporte botón.
RDO	RDO2	RDO2II	RDO2II2	RDO2II2_9	NRD	05/Jan/17	340	89,5	30	Sonido metálico en un cajete abierto, doble línea incisa en el labio.
RDO	RDO2	RDO2II	RDO2II2-3	RDO2II2-3_12	NRD	05/Jan/17	30,1	0	60	
RDO	RDO2	RDO2II	RDO2II3	RDO2II3_7	NRD	05/Jan/17	47,2	0	90	
RDO	RDO2	RDO2IIIA	RDO2IIIA4	RDO2IIIA4_10	NRD	05/Jan/17	19,2	0	30	
SR	SR1	SR1III	SR1III3	SR1II2_4	NRD	13/Jan/17	95,5	0	25	
SR	SR1	SR1II	SR1II3	SR1II3_9	NRD	13/Jan/17	416,5	0	30	
SR	SR1	SR1III	SR1III3	SR1III3_8	NRD	13/Jan/17	20,5	0	20	
SRH	SRH1	SRH1I	SRH1I2	SRH1I2_3	NRD	13/Jan/17	33	0	25	
SRH	SRH1	SRH1Ia	SRH1Ia2	SRH1Ia2_4	NRD	13/Jan/17	196	0	25	
SRH	SRH1	SRH1Ia	SRH1Ia3	SRH1Ia3_21	NRD	13/Jan/17	60,6	0	25	
SRH	SRH1	SRH1Ia	SRH1Ia3	SRH1Ia3_5	NRD	13/Jan/17	57,2	0	25	
SRH	SRH1	SRH1II	SRH1II2	SRH1II2_7	NRD	13/Jan/17	93,3	0	25	Rojo sobre blanco.
SRH	SRH1	SRH1II	SRH1II3	SRH1II3_10	NRD	13/Jan/17	76	0	20	
SRH	SRH1	SRH1IIa	SRH1IIa2	SRH1IIa2_13	NRD	13/Jan/17	117,5	0	25	
SRH	SRH1	SRH1I	SRH1I2	SRH1IIa2_14	NRD	13/Jan/17	40,5	0	25	Bordes con refuerzo y fractura anómala, revisar.
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_15	NRD	13/Jan/17	23,6	0	30	
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_18	NRD	13/Jan/17	20,5	0	25	
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_19	NRD	13/Jan/17	3,5	0	20	
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_20	NRD	13/Jan/17	7	0	25	
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_22	NRD	13/Jan/17	61,3	0	25	
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_24	NRD	13/Jan/17	9	0	20	Rim-neck con refuerzo.
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_25	NRD	13/Jan/17	57	0	20	
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_26	NRD	13/Jan/17	75	0	20	
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_29	NRD	13/Jan/17	51,4	0	20	
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_30	NRD	13/Jan/17	60,5	0	35	
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_31	NRD	13/Jan/17	35,5	0	25	
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_32	NRD	13/Jan/17	25,5	0	25	
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_34	NRD	13/Jan/17	31,5	0	25	
SRH	SRH1	SRH1IIa	SRH1IIa3	SRH1IIa3_37	NRD	13/Jan/17	41,1	0	25	
SRH	SRH1	SRH1IIa	SRH1IIa4	SRH1IIa4_38	NRD	13/Jan/17	0	0	49,8	
SRH	SRH1	SRH1IIa	SRH1IIa4	SRH1IIa4_39	NRD	13/Jan/17	10	0	25	
SRH	SRH1	SRH1S	SRH1S2	SRH1S2_2	NRD	13/Jan/17	154	0	25	
SRH	SRH1	SRH1S	SRH1SS	SRH1SS_11	NRD	13/Jan/17	21,3	0	25	Cerámica de apariencia colonial y más reciente también.
SRH	SRH1	SRH1T	SRH1T3	SRH1T3_17	NRD	13/Jan/17	64,4	0	25	
SRH	SRH1	SRH1T	SRH1T3	SRH1T3_28	NRD	13/Jan/17	33,5	0	0	
UBI	UBI1A	UBI1A?	UBI1A??	UBI1A??_	NRD	04/Jan/17	0	25,7	25	
UBI	UBI1A	UBI1AIB	UBI1AIB5	UBI1AIB5_4	NRD	04/Jan/17	352,7	304,1	30	
UBI	UBI1A	UBI1AIII	UBI1AIII6	UBI1AIII6_13	NRD	04/Jan/17	68	34,2	25	
UBI	UBI1A	UBI1AIII	UBI1AIII6	UBI1AIII6_16	NRD	04/Jan/17	98,8	51,7	25	
UBI	UBI1B	UBI1BI	UBI1BI4	UBI1BI4_2	NRD	04/Jan/17	0	11,6	20	Too small and eroded to sample
UBI	UBI1B	UBI1BIB	UBI1BIB5	UBI1BIB5_10	NRD	04/Jan/17	89,6	0	100	Peccari support.
UBI	UBI1B	UBI1BIB	UBI1BIB5	UBI1BIB5_11	NRD	04/Jan/17	30,2	0	65	
UBI	UBI1B	UBI1BIB	UBI1BIB5	UBI1BIB5_14	NRD	04/Jan/17	20,9	0	70	
UBI	UBI1B	UBI1BIB	UBI1BIB5	UBI1BIB5_46	NRD	04/Jan/17	41,2	12	25	2 bases tienen cicatriz de soporte.
UBI	UBI1B	UBI1BIB	UBI1BIB5	UBI1BIB5_56	NRD	04/Jan/17	14,2	0	25	

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
UBI	UBI1B	UBI1BIB	UBI1BIB5	UBI1BIB5_8	NRD	04/Jan/17	449,3	304,4	25	Material erosionado, como que más oscuro que el anterior y fragmentado. Las paredes son delgadas pero no tanto como los niveles inferiores de la U1. Hay una base con aparente huella de soporte o anular.
UBI	UBI1B	UBI1BIB	UBI1BIB5	UBI1BIB5_9	NRD	04/Jan/17	26,6	0	90	
UBI	UBI1B	UBI1BIII	UBI1BIII5	UBI1BIII5_49	NRD	04/Jan/17	118,4	0	135	Comal
UBI	UBI1B	UBI1BIII	UBI1BIII5	UBI1BIII5_52	NRD	04/Jan/17	0	8,7	20	
UBI	UBI1B	UBI1BIII	UBI1BIII5	UBI1BIII5_55	NRD	04/Jan/17	36,8	0	0	
UBI	UBI1B	UBI1BIII	UBI1BIII5	UBI1BIII5_60	NRD	04/Jan/17	26,9	12,5	25	
UBI	UBI1B	UBI1BIII	UBI1BIII6	UBI1BIII6_18	NRD	04/Jan/17	165,9	120	25	
UBI	UBI1C	UBI1CI	UBI1CI4	UBI1CI4_22	NRD	04/Jan/17	0	6,4	25	
UBI	UBI1C	UBI1CXI	UBI1CXI1	UBI1CXI1_20	NRD	04/Jan/17	234,7	142	25	
UBI	UBI1C	UBI1CXI	UBI1CXI1	UBI1CXI1_24	NRD	04/Jan/17	29,9	0	35	
UBI1C	UBI1C	UBI1CXI	UBI1CXI2	UBI1CXI2_25	NRD	04/Jan/17	383,3	162,7	30	El appliqué es un smiley.
UBI	UBI1C	UBI1CXI	UBI1CXI3	UBI1CXI3_27	NRD	04/Jan/17	368,6	200,7	25	
UBI	UBI1C	UBI1CXI	UBI1CXI3	UBI1CXI3_30	NRD	04/Jan/17	133,1	82,1	25	
UBI	UBI1C	UBI1CXI	UBI1CXI4	UBI1CXI4_35	NRD	04/Jan/17	99,9	22,7	20	
UBI	UBI1C	UBI1CXII	UBI1CXII5	UBI1CXII5_53	NRD	04/Jan/17	132,9	69,3	20	
UBI	UBI1C	UBI1CXIII	UBI1CXIII4	UBI1CXIII4_36	NRD	04/Jan/17	123,1	62	30	
UBI	UBI1C	UBI1CXIII	UBI1CXIII5	UBI1CXIII5_43	NRD	04/Jan/17	379	197	30	
UBI	UBI1C	UBI1CXIII	UBI1CXIII5	UBI1CXIII5_51	NRD	04/Jan/17	36,6	0	40	
UBI	UBI1C	UBI1CXIII	UBI1CXIII5	UBI1CXIII5_63	NRD	04/Jan/17	0	2	15	Too small to sample.
UBI	UBI1	UBI1III	UBI1III5	UBI1III5_67	NRD	04/Jan/17	0	12,1	20	Limpieza de perfil, no se muestrea.
UBI	UBI2	UBI2I	UBI2I-1	UBI2I-1_2	NRD	05/Jan/17	47	31,5	30	
UBI	UBI2	UBI2I	UBI2I-1	UBI2I-1_4	NRD	05/Jan/17	0	206	40	
UBI	UBI2	UBI2IA	UBI2IA0	UBI2IA0_7	NRD	05/Jan/17	214	163,5	25	
UBI	UBI2	UBI2IV	UBI2IV1	UBI2IV1_15	NRD	05/Jan/17	89,8	27	35	El borde cerrado tiene appliqué de chipotes.
UBI	UBI2	UBI2IV	UBI2IV2	UBI2IV2_20	NRD	05/Jan/17	42,8	15,8	35	
UBI	UBI2	UBI2II	UBI2II0	UBI2VI1_12	NRD	05/Jan/17	101,8	38,9	30	
UBI	UBI2	UBI2VI	UBI2VI1	UBI2VI1_17	NRD	05/Jan/17	4,8	0	25	
UBI	UBI2	UBI2VI	UBI2VI1	UBI2VI1_19	NRD	05/Jan/17	20,3	6,3	35	
UBI	UBI3A	UBI3A?	UBI3A??	UBI3A?_84	NRD	03/Jan/17	0	104,6	35	Posible engobe blanco, engobes rojos oscuros, paredes delgadas
UBI	UBI3AA	UBI3AAV	UBI3AA12	UBI3AA12_81	NRD	04/Jan/17	12,6	6,4	25	
UBI	UBI3AA	UBI3AAI	UBI3AAI11	UBI3AAI11_83	NRD	04/Jan/17	31,3	0	30	Fragmentos de paredes más gruesas (menos el de engobe blanco).
UBI	UBI3AA	UBI3AAVIII	UBI3AAVIII12	UBI3AAVIII12_79	NRD	04/Jan/17	0	7,5	15	Muy pequeño para muestrear.
UBI3AA	UBI3AA	UBI3AAVIIIF3	UBI3AAVIIIF313	UBI3AAVIIIF313_80	NRD	03/Jan/17	253,2	84	35	Borde con engobe rojo, doble linea incisa al exterior. Ahumados.
UBI	UBI3AB	UBI3ABVIII	UBI3ABVIII12	UBI3ABVIII12_17	NRD	04/Jan/17	956	292,5	30	Bases ligeramente concavas, paredes delgadas, formas abiertas, platos y/comales.
UBI	UBI3AB	UBI3ABVIII	UBI3ABVIII12	UBI3ABVIII12_20	NRD	04/Jan/17	27,5	0	40	Soporte hueco mamiforme perforado.
UBI	UBI3AB	UBI3ABVIII	UBI3ABVIII12	UBI3ABVIII12_21	NRD	04/Jan/17	68,3	0	40	Soporte mamiforme pero a diferencia de los anteriores es sólido y no tiene perforaciones.
UBI	UBI3AB	UBI3ABVIII	UBI3ABVIII12	UBI3ABVIII12_22	NRD	04/Jan/17	107,8	0	10	
UBI	UBI3AB	UBI3ABVIII	UBI3ABVIII13	UBI3ABVIII13_24	NRD	03/Jan/17	872	311	35	
UBI	UBI3AB	UBI3ABVIII	UBI3ABVIII13	UBI3ABVIII13_26	NRD	03/Jan/17	914,3	291,1	40	Mucha variedad en soportes, pareces delgadas pero ya no tanto.
UBI	UBI3AB	UBI3ABVIII	UBI3ABVIII13	UBI3ABVIII13_27	NRD	03/Jan/17	718,1	236,9	35	Hay bastardos, soporte chichiforme, predominan formas abiertas. Engobe blanco muy escaso. Una base (abierta) tiene huella de empate de soporte.
UBI	UBI3AB	UBI3ABX	UBI3ABX14	UBI3ABVIII13_45	NRD	03/Jan/17	403,5	215,8	25	Siguen las paredes delgadas, formas abiertas predominantes y alto numero de bases.

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
UBI	UBI3AB	UBI3ABVIII	UBI3ABVIII14	UBI3ABVIII14_36	NRD	03/Jan/17	793,2	268,5	30	
UBI	UBI3AB	UBI3ABVIII	UBI3ABVIII14	UBI3ABVIII14_39	NRD	03/Jan/17	874,2	244,4	35	Paredes delgadas, ahumados al interior y exterior. Bases con marcas de fuego. Engobes blancos, rojos, cafes. Variabilidad en soportes (conicos) y asita. El aplique es de botoncito al interior.
UBI	UBI3AB	UBI3ABVIII	UBI3ABVIII14	UBI3ABVIII14_40	NRD	03/Jan/17	439	155,3	25	
UBI	UBI3AB	UBI3ABX	UBI3ABX15	UBI3ABX15_47	NRD	03/Jan/17	257,5	93,1	35	El engobe blanco parece como una base para engobes cafes y naranjas que se aplican encima. Labio biselado interior en forma de ojito como los de LV.
UBI	UBI3AB	UBI3ABX	UBI3ABX16	UBI3ABX16_48	NRD	03/Jan/17	3,5	0	25	El fragmento pequeno presenta ahumado interior.
UBI	UBI3AB	UBI3ABXIV	UBI3ABXIV17	UBI3ABXIV17_51	NRD	03/Jan/17	15,5	0	30	
UBI	UBI3AB	UBI3ABXIV	UBI3ABXIV20	UBI3ABXIV20_69	NRD	03/Jan/17	15,9	0	30	Paredes delgadas, feel arenoso.
UBI	UBI3A	UBI3AI	UBI3AI11	UBI3AI11_1	NRD	04/Jan/17	0	3,6	15	Too small to sample.
UBI	UBI3A	UBI3AI	UBI3AI11	UBI3AI11_2	NRD	05/Jan/17	0	35,5	45	
UBI	UBI3A	UBI3AV	1212,9	UBI3AV11_4	NRD	04/Jan/17	0	4	15	Muy fragmentado como para muestrear.
UBI	UBI3A	UBI3AV	UBI3AV12	UBI3AV12_14	NRD	04/Jan/17	0	6,2	25	Muy erosionado como para muestrear
UBI	UBI3A	UBI3AV	UBI3AV12	UBI3AV12_74	NRD	04/Jan/17	147,7	0	40	
UBI	UBI3A	UBI3AVIII	UBI3AVIII12	UBI3AVIII12_53	NRD	04/Jan/17	168,9	17,2	25	Limpieza de perfil pero tiene todos los datos.
UBI	UBI3A	UBI3AVIIIF3	UBI3AVIIIF313	UBI3AVIIIF313_75	NRD	03/Jan/17	45,1	16,5	25	Fragmentos erosionados, de paredes delgadas.
UBI	UBI3A	UBI3AX	UBI3AX15	UBI3AX15_78	NRD	03/Jan/17	2,7	0	20	
UBI3	UBI3A	UBI3AXIV	UBI3AXIV19	UBI3AXIV19_52	NRD	03/Jan/17	1,9	0	20	Muy erosionado, paredes delgadas.
UBI	UBI3B	UBI3B?	UBI3B??	UBI3B??_87	NRD	03/Jan/17	0	114,5	35	
UBI	UBI3BC	UBI3BCX	UBI3BCX16	UBI3BCX16_61	NRD	03/Jan/17	86,5	29,1	25	Dos bordes de formas abiertas presentan mucha erosion tanto en la superficie externa como en la interna, mientras que un tercer borde esta bien conservado. Por ello decidimos clasificar algunos cuerpos que presentan las mismas caracteristicas como NI.
UBI	UBI3B	UBI3BF1A	UBI3BF1A11	UBI3BF1A11_6	NRD	04/Jan/17	0	7,7	15	Muy fragmentado como para muestrear.
UBI	UBI3B	UBI3BF1A	UBI3BF1A12	UBI3BF1A12_10	NRD	04/Jan/17	17,4	0	40	
UBI	UBI3B	UBI3BF1A	UBI3BF1A12	UBI3BF1A12_11	NRD	04/Jan/17	0	12,3	25	Muy erosionado como para muestrear
UBI	UBI3B	UBI3BF1B	UBI3BF1B12	UBI3BF1B12_12	NRD	04/Jan/17	6,6	0	35	
UBI	UBI3B	UBI3BF1B	UBI3BF1B12	UBI3BF1B12_13	NRD	04/Jan/17	0	4,8	30	
UBI	UBI3B	UBI3BF1B	UBI3BF1B12	UBI3BF1B12_18	NRD	04/Jan/17	46,9	16,2	20	Uno de los bordes es cepillado al exterior.
UBI	UBI3B	UBI3BI	UBI3BI11	UBI3BI11_35	NRD	04/Jan/17	139	66,7	25	
UBI	UBI3B	UBI3BI	UBI3BI11	UBI3BI11_37	NRD	04/Jan/17	15,8	5,1	25	
UBI	UBI3B	UBI3BIIF1	UBI3BIIF111	UBI3BIIF111_5	NRD	04/Jan/17	0	13,2	15	Demasiado pequeños para muestrear.
UBI	UBI3B	UBI3BV	UBI3BV11	UBI3BV11_31	NRD	04/Jan/17	134	29,2	25	Fragmentos mucho más pequeños que en los niveles inferiores.
UBI	UBI3B	UBI3BV	UBI3BV11	UBI3BV11_41	NRD	04/Jan/17	201,2	122	20	
UBI	UBI3B	UBI3BV	UBI3BV11	UBI3BV11_43	NRD	04/Jan/17	494,8	227,7	25	Los incisos son en realidad esgrafiados, las bases tienen el exterior rugoso y el interior con buen acabado (los abiertos)
UBI	UBI3B	UBI3BV	UBI3BV12	UBI3BV12_34	NRD	04/Jan/17	24,3	0	77	
UBI	UBI3B	UBI3BVIIIA	UBI3BVIIIA12	UBI3BVIIIA12_70	NRD	04/Jan/17	435,8	141,8	30	Paredes delgadas, engobes rojo, engobe rojo sobre blanco, formas abiertas, bases planas, platos, muy poca olla, soportes mamiformes.
UBI	UBI3B	UBI3BXV	UBI3BXV14	UBI3BXV14_54	NRD	03/Jan/17	414,6	108,5	30	Aplique de botoncito pero al exterior del fragmento. Comales y platos, ahumados interiores y exteriores.
UBI	UBI3C	UBI3C?	UBI3C??	UBI3C??_85	NRD	03/Jan/17	0	8	25	

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
UBI	UBI3C	UBI3C?	UBI3C??	UBI3C??_86	NRD	03/Jan/17	0	78,3	40	
UBI	UBI3C	UBI3C?	UBI3C??	UBI3C??_9	NRD	03/Jan/17	0	13,1	25	
UBI	UBI3C	UBI3CXIV	UBI3CXIV16	UBI3CXIV16_67	NRD	03/Jan/17	10,8	0	30	Muy erosionado.
UBI	UBI3C	UBI3CXV	UBI3CXV12	UBI3CXV12_55	NRD	04/Jan/17	530,8	324	30	Uno de los cuerpos cerrados tiene cicatriz de lug y otro está perforado.
UBI	UBI3C	UBI3CXV	UBI3CXV12	UBI3CXV12_56	NRD	04/Jan/17	599,3	264,7	30	The lug is worked, excavated parts, not flat and round like we saw in the previous sites and also this unit. Lots of open shapes, flat bases, but some concave (first time we see this). Not sure lug or adorno. Soportes botón y mamiformes. Labio punzonado.
UBI	UBI3C	UBI3CXV	UBI3CXV13	UBI3CXV13_57	NRD	03/Jan/17	551,1	263,5	30	Menos eorsionado, lugs, adorno zoomorfo (parece sapo) igual al del M de AB.
UBI	UBI3C	UBI3CXV	UBI3CXV13	UBI3CXV13_60	NRD	03/Jan/17	104,8	36,7	25	Muy erosionado, paredes delgadas. Engobe blanco, café rojizo.
UBI	UBI3C	UBI3CXVII	UBI3CXVII13	UBI3CXVII13_66	NRD	03/Jan/17	21,9	19,2	0	Material muy erosionado.
WM	WM1C	WM1CH	WM1CH-5	WM1CH-5_44	NRD	05/Jan/17	0	14	25	
WM	WM1C	WM1CI	WM1CI-5	WM1CI-5_45	NRD	05/Jan/17	27,8	22,7	25	
WM	WM1C	WM1CIIM	WM1CIIM-5	WM1CIIM-5_48	NRD	05/Jan/17	97,1	43	25	
WM	WM1	WM1I	WM1I-4	WM1I-4_31	NRD	05/Jan/17	4,9	0	15	
WM	WM1	WM1I	WM1I-5	WM1I-5_30	NRD	05/Jan/17	129,8	98,1	30	
WM	WM1	WM1II	WM1II-4	WM1II-4_33	NRD	05/Jan/17	125	179	30	Mejor preservado que la unidad anterior.
WM	WM1	WM1IIC	WM1IIC-4	WM1IIC-4_10	NRD	05/Jan/17	0	2,8	20	With black paint.
WM	WM1	WM1VII	WM1VII-4	WM1VII-4_38	NRD	05/Jan/17	90	13,4	20	
WM	WM	WM1	WM1VII-4	WM1VII-4_41	NRD	05/Jan/17	43,1	0	75	
WM	WM1	WM1VIII	WM1VIII-4	WM1VIII-4_42	NRD	05/Jan/17	42,3	3,5	20	
WM	WM2	WM2I	WM2I-4	WM2I-4_1	NRD	05/Jan/17	365,5	179,7	30	El appliqué es de grano de café. La base es anular.
WM	WM2	WM2II&III	WM2II&III?	WM2II&III?_20	NRD	05/Jan/17	0	5,8	30	
WM	WM2	WM2II	WM2II-3	WM2II-3_22	NRD	05/Jan/17	32,3	0	25	
WM	WM2	WM2II	WM2II-3	WM2II-3_5	NRD	05/Jan/17	60,1	0	90	
WM	WM2	WM2II	WM2II-3	WM2II-3_6	NRD	05/Jan/17	46	0	40	
WM	WM2	WM2II	WM2II-3	WM2II-3_7	NRD	05/Jan/17	400,1	196	30	Mala conservación.
WM	WM2	WM2II	WM2II-4	WM2II-4_13	NRD	05/Jan/17	343	354	30	Incisión geométrica. El appliqué es un rollo paralelo a la boca.
WM	WM2	WM2IIB	WM2IIB-2	WM2IIB-2_23	NRD	05/Jan/17	18,7	0	25	
WM	WM2	WM2IIB	WM2IIB-2	WM2IIB-2_25	NRD	05/Jan/17	52,6	0	25	
WM	WM2	WM2IIB	WM2IIB-4	WM2IIB-4_9	NRD	05/Jan/17	38,6	25,7	45	
WM	WM2	WM2IIC	WM2IIC-4	WM2IIC-4_10	NRD	18/Jan/17	2,7	0	20	
WM	WM2	WM2IID	WM2IID-2	WM2IID-2_24	NRD	05/Jan/17	14,6	0	25	
WM	WM2	WM2IID	WM2IID-4	WM2IID-4_11	NRD	05/Jan/17	34,2	3	20	
WM	WM2	WM2III	WM2III-2	WM2III-2_16	NRD	06/Jan/17	112,6	0	10	Engobe rojo al exterior.
WM	WM2	WM2III	WM2III-2	WM2III-2_17	NRD	05/Jan/17	32,4	0	30	
WM	WM2	WM2III	WM2III-3	WM2III-3_14	NRD	05/Jan/17	292	196,3	20	Dos bordes tienen pintura negra (al interior y exterior).
WM	WM2	WM2II-IV	WM2II-IV-2	WM2II-IV-2_27	NRD	05/Jan/17	19	0	60	Ahumado al interior.
WM	WM2	WM2II-IV	WM2II-IV-2	WM2II-IV-2_28	NRD	05/Jan/17	32,5	0	60	
ZAR	ZAR1	ZAR1I	ZAR1I1	ZAR1I1_3	NRD	30/Dec/16	43,1	9,5	15	
ZAR	ZAR1	ZAR1II	ZAR1II2	ZAR1II2_10	NRD	30/Dec/16	130,6	48,9	30	Muy erosionado, extremadamente difícil distinguir entre abiertos y cerrados. El contexto corresponde a una concentración de cerámica.
ZAR	ZAR1	ZAR1II	ZAR1II2	ZAR1II2_7	NRD	30/Dec/16	5,1	0	12	Bola de barro café.

Site	Excavation_Unit	Stratigraphic_Unit	Level	Bag_ Number	Recorder	Date_Rec	Weight_ Sampled	Weight_Non-Sampled	Avg_ Length	Notes
ZAR	ZAR1	ZAR1II	ZAR1II2	ZAR1II2_9	NRD	30/Dec/16	577,7	491,5	30	Material bastante erosionado, más formas cerradas y paredes gruesas. Sí se conservan engobes pero fue difícil distinguir formas cerradas de abiertas. Hay unos fragmentos que parecieran tener engobe blanco, puede ser un proceso deposicional, no es claro
ZAR	ZAR1	ZAR1II	ZAR1II3	ZAR1II3_11	NRD	30/Dec/16	141,5	44,1	25	
ZAR	ZAR1	ZAR1II	ZAR1II3	ZAR1II3_13	NRD	30/Dec/16	165,1	131,6	30	Material muy erosionado, es difícil reconocer formas cerradas de abiertas y hasta distinguir bordes. Puede que muchos sean fragmentos de una misma vasija.
ZAR	ZAR1	ZAR1III	ZAR1III4	ZAR1III4_22	NRD	30/Dec/16	6	0	30	
ZAR	ZAR2	ZAR2I	ZAR2I2	ZAR2I2_14	NRD	30/Dec/16	13,7	0	15	El borde está escarbado horizontalmente como los que vimos en AB (la parte más antigua)
ZAR	ZAR2	ZAR2II	ZAR2II2	ZAR2II2_18	NRD	30/Dec/16	1,6	0	15	
ZAR	ZAR3	ZAR3I	ZAR3I2	ZAR3I2_21	NRD	30/Dec/16	8,8	0	30	
ZAR	ZAR4	ZAR4I	ZAR4I2	ZAR4I2_25	NRD	30/Dec/16	154,2	102,6	25	Muy erosionado, difícil distinguir entre cerrado y abierto, probablemente son fragmentos de pocas vasijas de pasta en general roja.
ZAR	ZAR4	ZAR4III	ZAR4III3	ZAR4III3_28	NRD	30/Dec/16	32,8	18,5	25	
ZAR	ZAR5	ZAR5F1	ZAR5F14-5	ZAR5F14-5_VASIJA	NRD	13/Jan/17	335,4	0	65	
ZAR	ZAR5	ZAR5I	ZAR5I2	ZAR5I2_43	NRD	02/Jan/17	2,7	0	15	
ZAR	ZAR5	ZAR5II	ZAR5II3	ZAR5II3_41	NRD	02/Jan/17	133,5	27,6	30	Buena preservación, muy diferente al resto de las unidades del sitio.
ZAR	ZAR5	ZAR5II	ZAR5II4	ZAR5II4_33	NRD	02/Jan/17	524,9	480,5	35	En general pastas colores naranja claro, predominan las formas abiertas, buena preservación en contraste con todas las otras unidades de este sitio.
ZAR	ZAR5	ZAR5II	ZAR5II4	ZAR5II4_38	NRD	02/Jan/17	25,2	8,8	20	El cuerpo cerrado tiene engobe ahumado y parece ser parte de la misma vasija de cuerpo cerrado engobe ahumado encontrada en el nivel inferior (5).
ZAR	ZAR5	ZAR5II	ZAR5II5	ZAR5II5_36	NRD	02/Jan/17	40,4	21	30	Casi todo forma abierta, engobe ahumado exterior.
Totals							**137332,3**	**80537,9**		

Appendix 6

Ceramic inventory and preliminary analysis

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
AB1I2_2	Restricted	Body	6	0	6	2
AB1I2_2	Restricted	Rim/Neck	1	0	1	1
AB1I2_2	NI	Base incised	1	1	0	1
AB1I2_2	NI	Body	1	0	1	0
AB1I2_2	Unrestricted	Base	3	0	3	3
AB1I2_2	Unrestricted	Body	27	19	8	7
AB1I2_2	Unrestricted	Body glazed	0	0	0	1
AB1I2_2	Unrestricted	Rim w/incisions	1	1	0	0
AB1I2_2	Unrestricted	Rim/Neck	1	0	1	1
AB1I2_6	Restricted	Body	7	5	2	2
AB1I2_6	NI	Body	7	5	2	0
AB1I2_6	NI	Rim	1	1	0	0
AB1I2_6	Unrestricted	Base	3	1	2	2
AB1I2_6	Unrestricted	Body	54	33	21	15
AB1I2_6	Unrestricted	Body incised	5	1	4	2
AB1I2_6	Unrestricted	Rim	1	1	0	1
AB1I2_6	Unrestricted	Rim/Neck	1	0	1	1
AB1I3_15	Restricted	Body	3	2	1	2
AB1I3_15	Restricted	Rim	1	1	0	1
AB1I3_15	NI	Body	2	2	0	0
AB1I3_15	Unrestricted	Base	2	0	2	2
AB1I3_15	Unrestricted	Body	58	48	10	19
AB1II2_12	Restricted	Body	10	9	1	1
AB1II2_12	Restricted	Body incised	2	1	1	1
AB1II2_12	Restricted	Rim	1	1	0	0
AB1II2_12	Restricted	Rim w/incisions	0	0	0	0
AB1II2_12	Restricted	Rim/Neck w/incisions	1	0	1	1
AB1II2_12	Restricted	Shoulder/Neck	1	1	0	1
AB1II2_12	NI	Rim	2	0	2	0
AB1II2_12	Unrestricted	Body	86	65	21	20
AB1II2_12	Unrestricted	Body incised	1	0	1	1
AB1II2_12	Unrestricted	Neck	1	0	1	1
AB1II2_12	Unrestricted	Rim	6	3	3	3
AB1II2_12	Unrestricted	Rim w/incisions	1	1	0	1
AB1II2_12	Unrestricted	Rim/Neck	4	0	4	4
AB1II2_9	Restricted	Body	8	3	5	2
AB1II2_9	Restricted	Rim/Neck w/incisions	1	1	0	1
AB1II2_9	NI	Rim/Neck	2	1	1	0
AB1II2_9	Unrestricted	Base	5	3	2	2
AB1II2_9	Unrestricted	Body	102	61	41	30
AB1II2_9	Unrestricted	Body incised	2	1	1	1
AB1II2_9	Unrestricted	Neck	1	0	1	1
AB1II2_9	Unrestricted	NI	2	1	1	0
AB1II2_9	Unrestricted	Rim	3	0	3	2
AB1II2_9	Unrestricted	Rim/Neck	5	2	3	3
AB1II2_9	Unrestricted	Rim/Neck w/incisions	1	1	0	1
AB1II3_17	Restricted	Body	8	3	5	3
AB1II3_17	Restricted	Shoulder	2	0	2	2
AB1II3_17	Restricted	Shoulder/Neck	1	1	0	1
AB1II3_17	NI	Body	3	3	0	0
AB1II3_17	NI	NI	1	0	1	0
AB1II3_17	Unrestricted	Base	5	4	1	3
AB1II3_17	Unrestricted	Body	150	114	36	45
AB1II3_17	Unrestricted	Body incised	8	7	1	3
AB1II3_23	Restricted	Body	3	0	3	2
AB1II3_23	Unrestricted	Base	1	1	0	0
AB1II3_23	Unrestricted	Body	15	10	5	5
AB1II3_23	Unrestricted	Body incised	1	1	0	0
AB1II3_23	Unrestricted	Rim	1	0	1	1
AB1II4_29	Restricted	Body	3	2	1	2
AB1II4_29	Unrestricted	Base	3	1	2	2
AB1II4_29	Unrestricted	Body	32	16	16	10
AB1II4_29	Unrestricted	Body white slip	2	0	2	1
AB1II4_29	Unrestricted	Rim/Neck w/incisions	1	0	1	1
AB1III4_31	NI	Body	1	1	0	0
AB1III4_31	NI	Handle	1	1	0	1
AB1III4_31	Unrestricted	Base	2	1	1	2
AB1III4_31	Unrestricted	Body	28	15	13	7

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
AB1III4_31	Unrestricted	Body white slip	1	1	0	1
AB1III4_42	Unrestricted	Body	1	0	1	1
AB1III4_49	NI	Rim	1	1	0	1
AB1III4_49	Unrestricted	Body	2	0	2	1
AB1III5_50	Unrestricted	Body	1	0	1	1
AB1IV5_41	Restricted	Body	1	0	1	1
AB1IV5_41	NI	Body	1	1	0	0
AB1IV5_41	Unrestricted	Body	2	1	1	1
AB1P?_47	Restricted	Body	1	0	1	0
AB2??_?	Restricted	Shoulder/Neck	1	0	1	0
AB2??_?	Unrestricted	Body	1	0	1	0
AB2??_?	Unrestricted	Rim	1	0	1	0
AB2I1_22	Restricted	Body	8	4	4	3
AB2I1_22	Restricted	Rim/Neck	1	0	1	1
AB2I1_22	Restricted	Rim/Neck w/white slip	1	0	1	1
AB2I1_22	Restricted	Xúmitl	1	1	0	1
AB2I1_22	NI	Body	8	8	0	0
AB2I1_22	NI	Body incised	1	1	0	0
AB2I1_22	NI	Rim	1	1	0	0
AB2I1_22	Unrestricted	Base	2	0	2	2
AB2I1_22	Unrestricted	Body	53	41	12	15
AB2I1_22	Unrestricted	Body white slip	1	1	0	0
AB2I1_22	Unrestricted	Rim	1	0	1	1
AB2II?_67	Unrestricted	Body	6	3	3	0
AB2II2_35	Restricted	Body	35	30	5	10
AB2II2_35	Restricted	Body white slip	1	0	1	1
AB2II2_35	Restricted	Rim/Neck	1	0	1	1
AB2II2_35	Restricted	Shoulder/Neck	2	1	1	2
AB2II2_35	Restricted	Xúmitl	1	1	0	1
AB2II2_35	NI	Body	10	10	0	0
AB2II2_35	NI	Body incised	1	1	0	0
AB2II2_35	NI	Rim	1	1	0	0
AB2II2_35	NI	Rim w/incisions	2	1	1	0
AB2II2_35	NI	Shoulder/Neck	3	3	0	0
AB2II2_35	NI	Xúmitl	1	1	0	0
AB2II2_35	Unrestricted	Base	8	7	1	3
AB2II2_35	Unrestricted	Base incised	3	3	0	1
AB2II2_35	Unrestricted	Body	262	238	24	75
AB2II2_35	Unrestricted	Body incised	12	12	0	4
AB2II2_35	Unrestricted	Body white slip	7	6	1	2
AB2II2_35	Unrestricted	Rim	3	3	0	1
AB2II2_35	Unrestricted	Rim w/white slip	1	1	0	1
AB2II2_35	Unrestricted	Rim/Neck	3	2	1	3
AB2II2_35	Unrestricted	Shoulder/Neck	2	1	1	1
AB2II2_39	Restricted	Body	15	13	2	5
AB2II2_39	Restricted	Rim	1	1	0	1
AB2II2_39	Restricted	Shoulder	2	2	0	1
AB2II2_39	Restricted	Shoulder incised	4	4	0	1
AB2II2_39	Restricted	Xúmitl	1	1	0	1
AB2II2_39	NI	Body	9	9	0	3
AB2II2_39	NI	Body incised	1	1	0	0
AB2II2_39	NI	Rim	2	2	0	0
AB2II2_39	Unrestricted	Base	14	14	0	5
AB2II2_39	Unrestricted	Body	141	124	17	40
AB2II2_39	Unrestricted	Body incised	4	4	0	1
AB2II2_39	Unrestricted	Body white slip	3	3	0	1
AB2II2_39	Unrestricted	Rim	6	5	1	2
AB2II2_39	Unrestricted	Rim w/incisions	1	1	0	1
AB2II2_39	Unrestricted	Rim w/white slip	2	2	0	1
AB2II2_39	Unrestricted	Shoulder	2	1	1	1
AB2II2_57	Restricted	Base	1	1	0	1
AB2II2_57	Restricted	Body	16	13	3	5
AB2II2_57	Restricted	Shoulder	3	1	2	1
AB2II2_57	NI	Body	4	3	1	1
AB2II2_57	NI	Rim	1	1	0	0
AB2II2_57	Unrestricted	Base	10	7	3	4
AB2II2_57	Unrestricted	Body	416	358	58	100
AB2II2_57	Unrestricted	Body incised	20	17	3	6

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
AB2II2_57	Unrestricted	Body white slip	9	7	2	3
AB2II2_57	Unrestricted	Rim	15	12	3	6
AB2II2_57	Unrestricted	Rim w/white slip	4	4	0	4
AB2II2_57	Unrestricted	Rim/Neck	3	0	3	3
AB2II2_57	Unrestricted	Shoulder	5	5	0	1
AB2II2_58	Restricted	Body	12	9	3	4
AB2II2_58	Restricted	Rim/Neck	1	1	0	1
AB2II2_58	Restricted	Shoulder	2	2	0	1
AB2II2_58	NI	Body	7	7	0	2
AB2II2_58	NI	Body incised	1	1	0	0
AB2II2_58	NI	Rim	1	1	0	0
AB2II2_58	NI	Shoulder	2	2	0	0
AB2II2_58	NI	Support	1	0	1	1
AB2II2_58	Unrestricted	Base	7	5	2	3
AB2II2_58	Unrestricted	Body	182	156	26	46
AB2II2_58	Unrestricted	Body incised	15	12	3	7
AB2II2_58	Unrestricted	Body white slip	4	3	1	1
AB2II2_58	Unrestricted	Rim	5	3	2	5
AB2II2_58	Unrestricted	Rim w/incisions	1	0	1	1
AB2II2_58	Unrestricted	Rim/Neck	2	2	0	2
AB2II2_58	Unrestricted	Shoulder	1	1	0	1
AB2II2_58	Unrestricted	Xúmitl	2	2	0	2
AB2II2_60	Restricted	Body	28	21	7	7
AB2II2_60	Restricted	Shoulder/Neck	8	6	2	3
AB2II2_60	NI	Body	11	10	1	1
AB2II2_60	NI	Body incised	2	2	0	0
AB2II2_60	NI	Body white slip	2	1	1	0
AB2II2_60	NI	Rim	1	1	0	0
AB2II2_60	Unrestricted	Base	11	11	0	4
AB2II2_60	Unrestricted	Body	339	314	25	75
AB2II2_60	Unrestricted	Body excavated	1	1	0	1
AB2II2_60	Unrestricted	Body incised	16	14	2	4
AB2II2_60	Unrestricted	Body white slip	2	1	1	2
AB2II2_60	Unrestricted	Rim	6	6	0	2
AB2II2_60	Unrestricted	Rim w/white slip	1	1	0	1
AB2II2_60	Unrestricted	Rim/Neck	2	1	1	2
AB2II2_60	Unrestricted	Xúmitl	1	1	0	1
AB2III3_36	Unrestricted	Body	1	0	1	0
AB2III3_54	Unrestricted	Body	8	4	4	2
AB2III3_54	Unrestricted	Body incised	1	1	0	1
AB2III3_54	Unrestricted	Rim	1	0	1	1
AB2IV3_56	NI	Body	2	2	0	0
AB2IV3_56	Unrestricted	Body	46	33	13	15
AB2IV3_56	Unrestricted	Body incised	5	5	0	1
AB2IV3_56	Unrestricted	Rim	2	0	2	2
AB3II2_84	Restricted	Body	11	9	2	2
AB3II2_84	Restricted	Shoulder	1	1	0	1
AB3II2_84	Restricted	Shoulder/Neck	1	1	0	1
AB3II2_84	NI	Body	3	3	0	0
AB3II2_84	Unrestricted	Body	27	18	9	9
AB3II2_84	Unrestricted	Body incised	3	3	0	1
AB3II2_84	Unrestricted	Rim	1	1	0	0
AB3II2_84	Unrestricted	Rim/Neck	1	0	1	1
AB3II2_86	Restricted	Body	2	1	1	1
AB3II2_86	Unrestricted	Body	1	1	0	0
AB3III?_119	Unrestricted	Rim/Neck	1	0	1	0
AB3III3_133	Restricted	Body	15	11	4	5
AB3III3_133	Restricted	Body acanalado	1	1	0	1
AB3III3_133	Restricted	Body incised	3	3	0	1
AB3III3_133	Restricted	Rim/Neck	2	0	2	2
AB3III3_133	Restricted	Shoulder	1	0	1	1
AB3III3_133	NI	Body	14	11	3	4
AB3III3_133	NI	Shoulder	1	0	1	0
AB3III3_133	Unrestricted	Base	1	0	1	1
AB3III3_133	Unrestricted	Body	111	88	23	33
AB3III3_133	Unrestricted	Rim	5	2	3	4
AB3III3_133	Unrestricted	Rim/Neck	5	1	4	5
AB3III3_133	Unrestricted	Shoulder	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
AB3IV4_90	Unrestricted	Body	9	4	5	5
AB3IV4_90	Unrestricted	Rim	1	0	1	1
AB3IV4_90	Unrestricted	Rim w/white slip	2	0	2	2
AB3IV4_99	Restricted	Shoulder	1	0	1	1
AB3IV4_99	NI	Lug	1	0	1	1
AB3IV4_99	Unrestricted	Base	4	2	2	2
AB3IV4_99	Unrestricted	Body	13	9	4	5
AB4??_??	Restricted	Body	2	1	1	0
AB4??_??	NI	Rim	1	0	1	0
AB4??_??	Unrestricted	Body	1	1	0	0
AB4II1_66	Restricted	Body	1	1	0	1
AB4II1_66	NI	Body	1	0	1	1
AB4II1_66	Unrestricted	Body	1	1	0	0
AB4II2_81	Restricted	Body	16	9	7	7
AB4II2_81	Restricted	Rim/Neck	1	0	1	1
AB4II2_81	Restricted	Shoulder	1	0	1	1
AB4II2_81	NI	Body	5	5	0	0
AB4II2_81	Unrestricted	Body	42	29	13	14
AB4II3_91	NI	Body	1	0	1	1
AB4II3_91	Unrestricted	Body	5	2	3	3
AB4II3_91	Unrestricted	Rim	1	1	0	1
AB4IIF_132	NI	Body	1	1	0	1
AB4III2_125	Restricted	Body	1	1	0	1
AB5II1_65	NI	Body	3	2	1	1
AB5II2_173	NI	Body	5	0	5	2
AB5II2_173	Unrestricted	Body	7	6	1	2
AB5III2_109	Unrestricted	Body	2	1	1	1
AB5III3_106	NI	Body	4	2	2	2
AB5III4_110	NI	Body	1	1	0	1
AB6II2_112	Restricted	Body	14	6	8	8
AB6II2_112	Restricted	Shoulder	1	0	1	1
AB6II2_112	NI	Rim	1	1	0	0
AB6II2_112	Unrestricted	Base	1	0	1	1
AB6II2_112	Unrestricted	Body	7	5	2	2
AB6II2_112	Unrestricted	Body with appliqué	1	1	0	1
AB6II2_112	Unrestricted	Rim	1	1	0	1
AB6II2_112	Unrestricted	Rim/Neck	1	0	1	1
AB6II3_114	Restricted	Body	12	7	5	5
AB6II3_114	NI	Body	2	2	0	0
AB6II3_114	Unrestricted	Body	8	6	2	2
AB6II3_114	Unrestricted	Rim	2	0	2	2
AB6II3_114	Unrestricted	Rim/Neck	2	1	1	2
AM1??_32	Restricted	Body	1	0	1	1
AM1??_32	NI	Body	4	4	0	4
AM1??_32	Unrestricted	Body	2	2	0	2
AM1I1_1	Restricted	Body	1	0	1	1
AM1I1_1	Unrestricted	Body	1	1	0	1
AM1I5_4	Restricted	Rim/Neck	1	0	1	1
AM1IB2_7	Restricted	Body	1	1	0	1
AM1IB2_7	NI	Rim/Neck	0	0	0	0
AM1IB2_7	Unrestricted	Body	2	2	0	2
AM1IB3_5	Restricted	Body	4	3	1	4
AM1IB3_5	Unrestricted	Body	1	0	1	0
AM1IB4_6	NI	Rim	1	1	0	1
AM1IB4_6	Unrestricted	Body incised	1	0	1	1
AM1II?_31	Restricted	Body incised	1	0	1	1
AM1II?_31	Unrestricted	Body incised	1	1	0	1
AM1II?_31	Unrestricted	Rim/Neck	1	0	1	1
AM1II3_8	Restricted	Rim/Neck	1	0	1	1
AM1II4_14	Unrestricted	Body	5	2	3	5
AM1II4_9	Restricted	Rim/Neck	1	0	1	1
AM1II4_9	Unrestricted	Body	1	1	0	1
AM1II4_9	Unrestricted	Body incised	1	1	0	1
AM1II5_12	Restricted	Rim/Neck	1	1	0	1
AM1II5_12	Unrestricted	Body	4	1	3	4
AM1II6_19	Clay ball	NA	1	1	0	1
AM1II6_19	Restricted	Base	1	0	1	1
AM1II6_19	Restricted	Body	3	0	3	3

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
AM1II6_19	Unrestricted	Body	2	1	1	2
AM1II6_19	Unrestricted	Rim/Neck	1	0	1	1
AM1IIa4_10	Restricted	Rim/Neck	1	0	1	1
AM1IIa4_10	NI	Rim	1	1	0	1
AM1IIa4_10	Unrestricted	Body	3	2	1	3
AM1IIa4_15	Restricted	Body	1	0	1	1
AM1IIa4_15	NI	Body	1	0	1	1
AM1IIa4_15	Unrestricted	Body	1	0	1	1
AM1IIa4_15	Unrestricted	Body incised	1	1	0	1
AM1IIa5_16	Restricted	Body	2	0	2	2
AM1IIa5_16	NI	Handle	1	1	0	1
AM1IIa5_16	Unrestricted	Body	2	1	1	2
AM1IIa6_17	Restricted	Neck	1	0	1	1
AM1IV2_11	Unrestricted	Body	8	7	1	8
AM1IV2_11	Unrestricted	Rim/Neck	1	0	1	1
AM1V4_18	Restricted	Body incised	1	0	1	1
AM1V4_18	Unrestricted	Body	1	1	0	1
AM1VI6_22	Unrestricted	Body	1	0	1	1
AM1VI7_39	Restricted	Rim/Neck	1	0	1	1
AM1VI7_39	Unrestricted	Body	4	0	4	4
AM1VII11_28	Restricted	Body	1	0	1	1
AM1VII11_28	NI	Body	2	1	1	1
AM1VII11_28	Unrestricted	Body	2	1	1	2
AM1VII12_30	Unrestricted	Body	1	0	1	1
AM1VII7_24	Unrestricted	Body	1	0	1	1
AM1VII7_34	Restricted	Body	1	0	1	1
AM1VII7_34	Unrestricted	Body	2	1	1	2
AM1VII8_26	Restricted	Shoulder	1	0	1	1
AM1VII8_26	Unrestricted	Body	1	1	0	1
AO?SUP?_15	Unrestricted	Body w/lug & appliqué	1	0	1	1
AO1III3_5	Restricted	Body	30	10	20	10
AO1III3_5	Restricted	Rim/Neck	2	0	2	2
AO1III3_5	Restricted	Shoulder	7	1	6	4
AO1III3_5	NI	Body	29	26	3	0
AO1III3_5	NI	Rim	3	1	2	0
AO1III3_5	NI	Rim/Neck	3	0	3	1
AO1III3_5	Unrestricted	Base	4	2	2	2
AO1III3_5	Unrestricted	Body	181	132	49	51
AO1III3_5	Unrestricted	Body incised	1	1	0	1
AO1III3_5	Unrestricted	Body with appliqué	4	2	2	3
AO1III3_5	Unrestricted	Rim	5	3	2	1
AO1III3_5	Unrestricted	Rim/Neck	17	6	11	14
AO1III3_6	Restricted	Base	2	2	0	2
AO1III3_6	Restricted	Body	41	32	9	14
AO1III3_6	Restricted	Rim/Neck	1	0	1	1
AO1III3_6	Restricted	Shoulder	17	6	11	6
AO1III3_6	Restricted	Shoulder/Neck	2	0	2	2
AO1III3_6	NI	Body	23	17	6	7
AO1III3_6	NI	Handle	1	1	0	1
AO1III3_6	NI	NI	1	0	1	1
AO1III3_6	NI	Rim	3	2	1	0
AO1III3_6	NI	Rim/Neck	5	5	0	4
AO1III3_6	NI	Support	3	1	2	3
AO1III3_6	Unrestricted	Base	2	2	0	1
AO1III3_6	Unrestricted	Body	273	200	73	76
AO1III3_6	Unrestricted	Body with appliqué	1	0	1	1
AO1III3_6	Unrestricted	Lug	1	0	1	1
AO1III3_6	Unrestricted	Rim	4	3	1	1
AO1III3_6	Unrestricted	Rim w/incisions	1	0	1	1
AO1III3_6	Unrestricted	Rim w/zoomorphic adorno	1	1	0	1
AO1III3_6	Unrestricted	Rim/Neck	19	8	11	18
AO1IV4_11	Restricted	Body	13	10	3	5
AO1IV4_11	NI	Handle	1	0	1	1
AO1IV4_11	Unrestricted	Body	48	28	20	15
AO1IV4_11	Unrestricted	Lug	1	0	1	1
AO1IV4_11	Unrestricted	Rim/Neck	6	2	4	6
AO1IV5_56	Restricted	Body	13	8	5	5
AO1IV5_56	Restricted	Shoulder	2	1	1	2

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
AO1IV5_56	NI	Body	3	3	0	1
AO1IV5_56	NI	Rim	1	1	0	0
AO1IV5_56	NI	Rim/Neck	2	2	0	0
AO1IV5_56	Unrestricted	Base	1	0	1	1
AO1IV5_56	Unrestricted	Body	30	26	4	10
AO1IV5_56	Unrestricted	Body with appliqué	1	0	1	1
AO1IV5_56	Unrestricted	Rim	1	0	1	1
AO1IV5_56	Unrestricted	Rim/Neck	2	0	2	2
AO2I2_59	Restricted	Body	1	0	1	1
AO2I2_7	NI	Body	2	2	0	2
AO2II2_21	Unrestricted	Body	1	1	0	1
AO2II2_21	Unrestricted	Rim	1	0	1	1
AO2II3_25	Unrestricted	Body	2	1	1	2
AO2II3_25	Unrestricted	Rim	1	1	0	1
AO2II3_27	NI	Body	2	1	1	0
AO2II3_27	NI	Rim	1	1	0	0
AO2II3_27	Unrestricted	Body	4	3	1	4
AO2II3_27	Unrestricted	Rim	1	0	1	1
AO2II3_33	Unrestricted	Body	2	1	1	1
AO2II3_58	Restricted	Body	2	2	0	2
AO2II3_58	NI	Body	3	3	0	3
AO2II3_58	Unrestricted	Body	4	2	2	4
AO2II3_58	Unrestricted	Rim/Neck	1	0	1	1
AO2III3_26	Unrestricted	Body	1	0	1	1
AO2III3_60	Unrestricted	Body	1	1	0	1
AO3II3_14	Restricted	Body	2	2	0	1
AO3II3_14	NI	Base	1	0	1	1
AO3II3_14	NI	Body	9	8	1	1
AO3II3_14	Unrestricted	Body	14	9	5	5
AO3II3_19	Restricted	Body	2	0	2	2
AO3II3_19	NI	Support	1	0	1	0
AO3II3_19	Unrestricted	Rim/Neck	1	0	1	1
AO3II4_57	Restricted	Body	1	1	0	1
AO3II4_57	NI	Body	1	0	1	1
JH2II2_7	Unrestricted	Body	1	0	1	1
JH2II3_30	Unrestricted	Body	1	0	1	1
JH4II2-3_25	Unrestricted	Body	9	4	5	9
JH5I2_24	Unrestricted	Body	1	0	1	1
JH5I2_27	NI	Body	3	1	2	0
JH5S1_20	Restricted	Body	1	1	0	1
JH5S1_20	Restricted	Shoulder	1	0	1	1
JOR1BH17_1	Restricted	Body	1	0	1	0
JOR1BH17_1	NI	Body	1	1	0	0
JOR1CH16_4	Restricted	Body	4	2	2	0
JOR1CH16_4	NI	Body	2	2	0	0
JOR1CH16_4	Unrestricted	Body	1	0	1	0
JOR1CH16_4	Unrestricted	Rim	2	2	0	0
JOR2??_101	NI	Body	2	1	1	0
JOR2??_101	Unrestricted	Body	3	2	1	0
JOR2I5_11	NI	Body	1	0	1	1
JOR2I5_3	Restricted	Body	29	16	13	9
JOR2I5_3	Restricted	Body incised	1	1	0	1
JOR2I5_3	Restricted	Body white slip	2	0	2	2
JOR2I5_3	Restricted	Neck	2	0	2	2
JOR2I5_3	Restricted	Neck incised	1	0	1	1
JOR2I5_3	Restricted	Rim/Neck	1	0	1	1
JOR2I5_3	Restricted	Shoulder	1	0	1	1
JOR2I5_3	NI	Body	8	8	0	0
JOR2I5_3	NI	Rim	2	2	0	0
JOR2I5_3	Unrestricted	Body	18	13	5	5
JOR2I5_3	Unrestricted	Body punctuated	1	0	1	1
JOR2I5_3	Unrestricted	Rim/Neck	4	1	3	4
JOR2I5_8	Restricted	Body	4	2	2	1
JOR2I5_8	NI	Body	4	4	0	0
JOR2I5_8	Unrestricted	Body	3	2	1	1
JOR2I6_4	Restricted	Body	10	5	5	3
JOR2I6_4	Restricted	Rim/Neck	1	0	1	1
JOR2I6_4	Restricted	Shoulder	1	1	0	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
JOR2I6_4	NI	Body	1	1	0	0
JOR2I6_4	Unrestricted	Body	7	5	2	2
JOR2II5_13	Bead	NA	1	0	1	1
JOR2II5_14	Restricted	Neck incised	1	0	1	1
JOR2II5_14	Unrestricted	Body	1	1	0	1
JOR2II5_15	Restricted	Rim/Neck	1	0	1	1
JOR2II5_16	Unrestricted	Body	0	0	0	1
JOR2II5_17	Restricted	Body	1	0	1	1
JOR2II5_18	Restricted	Body	2	1	1	2
JOR2II5_19	Restricted	Body	1	0	1	1
JOR2II5_21	Unrestricted	Body	1	0	1	1
JOR2II5_24	Restricted	Body	11	6	5	3
JOR2II5_24	Restricted	Neck	2	0	2	2
JOR2II5_24	Restricted	Rim/Neck	2	0	2	2
JOR2II5_24	Restricted	Shoulder incised	1	0	1	1
JOR2II5_24	NI	Body	4	4	0	0
JOR2II5_24	NI	Body incised	1	1	0	1
JOR2II5_24	Unrestricted	Body	16	8	8	5
JOR2II5_24	Unrestricted	Rim/Neck	1	0	1	1
JOR2II5_25	Restricted	Body	60	20	40	20
JOR2II5_25	Restricted	Body white slip	1	0	1	1
JOR2II5_25	Restricted	Body with appliqué	2	1	1	2
JOR2II5_25	Restricted	Neck	3	0	3	3
JOR2II5_25	Restricted	Rim/Neck	5	0	5	5
JOR2II5_25	Restricted	Shoulder	5	0	5	5
JOR2II5_25	NI	Body	11	8	3	2
JOR2II5_25	NI	Rim	2	2	0	1
JOR2II5_25	NI	Support	1	1	0	1
JOR2II5_25	Unrestricted	Body	50	26	24	15
JOR2II5_25	Unrestricted	Body white slip	1	1	0	1
JOR2II5_25	Unrestricted	Rim	2	1	1	0
JOR2II5_25	Unrestricted	Rim/Neck	4	3	1	4
JOR2II5_27	Restricted	Body	31	10	21	8
JOR2II5_27	Restricted	Neck	1	0	1	1
JOR2II5_27	Restricted	Rim/Neck	6	0	6	6
JOR2II5_27	Restricted	Shoulder	2	1	1	2
JOR2II5_27	NI	Body	11	8	3	2
JOR2II5_27	NI	Rim	2	2	0	1
JOR2II5_27	Unrestricted	Base	1	1	0	1
JOR2II5_27	Unrestricted	Body	21	10	11	7
JOR2II5_27	Unrestricted	Body incised	2	1	1	2
JOR2II5_27	Unrestricted	Rim/Neck	1	1	0	1
JOR2II5_33	Seal	NA	1	0	1	1
JOR2III5_28	Clay ball	NA	1	0	1	1
JOR2III6_29	Restricted	Body	1	0	1	1
JOR2III6_29	Unrestricted	Body	1	1	0	1
JOR2III6_30	Unrestricted	Rim/Neck acanalado	1	0	1	1
JOR2III6_31	Restricted	Body	1	0	1	1
JOR2III6_34	Restricted	Base	1	0	1	1
JOR2III6_34	Restricted	Body	75	50	25	25
JOR2III6_34	Restricted	Neck	3	3	0	3
JOR2III6_34	Restricted	Rim/Neck	5	3	2	5
JOR2III6_34	Restricted	Rim/Neck w/appliqué	1	0	1	1
JOR2III6_34	Restricted	Shoulder	2	1	1	2
JOR2III6_34	Restricted	Shoulder acanalado	1	1	0	1
JOR2III6_34	Restricted	Shoulder/Neck	1	0	1	1
JOR2III6_34	NI	Body	23	21	2	3
JOR2III6_34	Unrestricted	Base	3	2	1	3
JOR2III6_34	Unrestricted	Body	69	52	17	17
JOR2III6_34	Unrestricted	Body incised	1	1	0	1
JOR2III6_34	Unrestricted	Rim/Neck	5	3	2	5
JOR2IV6_32	Unrestricted	Body	1	0	1	1
JOR2IV6_68	Restricted	Body	17	10	7	5
JOR2IV6_68	Restricted	Neck	2	1	1	2
JOR2IV6_68	Restricted	Rim/Neck	3	0	3	3
JOR2IV6_68	Restricted	Shoulder	1	0	1	1
JOR2IV6_68	NI	Body	7	7	0	0
JOR2IV6_68	NI	Rim	1	0	1	0

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
JOR2IV6_68	Unrestricted	Body	15	7	8	5
JOR2IV6_68	Unrestricted	Rim/Neck	4	1	3	4
JOR2IVa6_75	Unrestricted	Rim/Neck	1	0	1	1
JOR2IVa6_76	Restricted	Body	1	0	1	1
JOR2IVa6_77	Unrestricted	Body	1	0	1	1
JOR2IVa6_78	Restricted	Body	1	0	1	1
JOR2IVa6_79	Restricted	Body	1	0	1	1
JOR2IVa6_80	Unrestricted	Body	1	0	1	1
JOR2IVa6_81	Unrestricted	Body	1	0	1	1
JOR2IVa6_82	Unrestricted	Body	1	0	1	1
JOR2IVa6_83	Unrestricted	Body	1	0	1	1
JOR2IVa7_71	Restricted	Body	8	2	6	6
JOR2IVa7_71	Restricted	Shoulder	1	0	1	1
JOR2IVa7_71	NI	Body	2	1	1	0
JOR2IVa7_71	Unrestricted	Body	8	7	1	2
JOR2IVa7_86	Restricted	Base	1	0	1	1
JOR2IVa7_86	Restricted	Body	9	5	4	4
JOR2IVa7_86	Restricted	Shoulder	2	0	2	2
JOR2IVa7_86	NI	Body	4	4	0	0
JOR2IVa7_86	Unrestricted	Base	1	0	1	1
JOR2IVa7_86	Unrestricted	Body	5	4	1	2
JOR2IVa7_86	Unrestricted	Rim	2	0	2	2
JOR2IVa7_86	Unrestricted	Rim/Neck	2	1	1	2
JOR2V6_40	Restricted	Body	1	0	1	1
JOR2V6_40	Restricted	Shoulder	1	1	0	1
JOR2V6_41	Restricted	Body	1	0	1	1
JOR2V6_42	Restricted	Body	1	0	1	1
JOR2V6_43	Restricted	Base	1	0	1	1
JOR2V6_44	Restricted	Body	1	0	1	1
JOR2V7_37	Restricted	Base	1	0	1	1
JOR2V7_37	Restricted	Body	1	1	0	1
JOR2V7_38	Restricted	Base	1	0	1	1
JOR2V7_39	NI	Handle	1	0	1	1
JOR2V7_45	Restricted	Base	2	0	2	2
JOR2V7_45	Restricted	Body	36	16	20	12
JOR2V7_45	Restricted	Rim/Neck	3	0	3	3
JOR2V7_45	Restricted	Shoulder	2	0	2	2
JOR2V7_45	NI	Body	10	7	3	2
JOR2V7_45	NI	Handle	1	1	0	1
JOR2V7_45	NI	Rim	2	1	1	2
JOR2V7_45	Unrestricted	Base	1	1	0	1
JOR2V7_45	Unrestricted	Body	38	23	15	14
JOR2V7_45	Unrestricted	Rim	1	1	0	1
JOR2V7_45	Unrestricted	Rim/Neck	3	0	3	3
JOR2V7_51	Restricted	Base	1	0	1	1
JOR2V7_51	Unrestricted	Body	1	1	0	1
JOR2V7_52	Restricted	Base	1	0	1	1
JOR2V7_53	Unrestricted	Body	1	0	1	1
JOR2V7_54	Unrestricted	Body	1	0	1	1
JOR2V7_55	Unrestricted	Body	1	0	1	1
JOR2V7_56	Unrestricted	Body	1	0	1	1
JOR2V7_57	Restricted	Body	10	10	0	1
JOR2V7_57	Unrestricted	Body	1	0	1	1
JOR2V7_58	Restricted	Body	1	0	1	1
JOR2V7_59	Unrestricted	Rim/Neck	1	0	1	1
JOR2V7_60	Unrestricted	Rim/Neck	1	0	1	1
JOR2V7_61	Restricted	Body	1	0	1	1
JOR2V7_62	Unrestricted	Rim/Neck w/appliqué	1	0	1	1
JOR2V7_63	Unrestricted	Rim/Neck	0	0	0	0
JOR2V7_64	Restricted	Body	1	0	1	1
JOR2V7_91	Restricted	Body	10	8	2	3
JOR2V7_91	Restricted	Neck	1	1	0	1
JOR2V7_91	NI	Body	6	6	0	0
JOR2V7_91	Unrestricted	Body	1	0	1	1
JOR2VI7_48	Restricted	Body	31	18	13	10
JOR2VI7_48	Restricted	Body with appliqué	1	0	1	1
JOR2VI7_48	Restricted	Neck	2	2	0	2
JOR2VI7_48	Restricted	Rim	1	1	0	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
JOR2VI7_48	Restricted	Shoulder	1	1	0	1
JOR2VI7_48	Restricted	Shoulder/Neck	1	0	1	1
JOR2VI7_48	NI	Body	11	9	2	2
JOR2VI7_48	Unrestricted	Base	2	0	2	2
JOR2VI7_48	Unrestricted	Body	11	5	6	5
JOR2VI7_48	Unrestricted	Rim/Neck	2	2	0	2
JOR2VI7_66	Unrestricted	Body	1	0	1	1
JOR2VI7_67	Restricted	Body	1	1	0	1
JOR2VI7_67	NI	Body	1	1	0	1
JOR2VI7_67	Unrestricted	Body	1	0	1	1
JOR2VI7_74	Restricted	Body	1	0	1	1
JOR2VI7_74	Unrestricted	Body	1	0	1	1
JOR2VI8_92	Restricted	Body	49	26	23	15
JOR2VI8_92	Restricted	Body with appliqué	1	1	0	1
JOR2VI8_92	Restricted	Rim	1	1	0	1
JOR2VI8_92	Restricted	Rim/Neck	6	0	6	6
JOR2VI8_92	NI	Body	24	22	2	2
JOR2VI8_92	Unrestricted	Body	21	14	7	7
JOR2VI8_92	Unrestricted	Rim/Neck	2	1	1	2
JOR2VII8_95	Restricted	Body	1	0	1	1
JOR2VII9_96	Restricted	Body	23	14	9	7
JOR2VII9_96	Restricted	Body with appliqué	1	0	1	1
JOR2VII9_96	Restricted	Neck	4	2	2	2
JOR2VII9_96	Restricted	Rim/Neck	3	2	1	3
JOR2VII9_96	NI	Body	21	19	2	2
JOR2VII9_96	NI	Rim	1	0	1	0
JOR2VII9_96	NI	Rim/Neck	2	2	0	1
JOR2VII9_96	Unrestricted	Body	5	1	4	4
JOR2VII9_96	Unrestricted	Rim/Neck	3	0	3	3
JOR2VII9_98	Restricted	Body	1	0	1	1
JOR2VII9_98	Restricted	Rim/Neck	1	0	1	1
JOR2VII9_98	NI	Body	7	2	5	4
JOR2VII9_98	Unrestricted	Body	2	1	1	1
LA13_14	Restricted	Base	2	1	1	2
LA13_14	Restricted	Body	5	3	2	2
LA13_14	Restricted	Neck	1	0	1	1
LA13_14	NI	Handle	1	1	0	1
LA13_14	NI	NI	1	0	1	1
LA13_14	Unrestricted	Base	2	1	1	1
LA13_14	Unrestricted	Body	33	13	20	11
LA13_14	Unrestricted	Rim	2	1	1	1
LA13_14	Unrestricted	Rim/Neck	4	2	2	4
LA1I2_1	Restricted	Body	12	9	3	4
LA1I2_1	Restricted	Neck	2	2	0	2
LA1I2_1	NI	Body	7	4	3	3
LA1I2_1	NI	Rim	4	4	0	0
LA1I2_1	Unrestricted	Base	2	1	1	2
LA1I2_1	Unrestricted	Body	82	60	22	25
LA1I2_1	Unrestricted	Rim	3	3	0	1
LA1I2_1	Unrestricted	Rim/Neck	10	7	3	7
LA1II2_4	Restricted	Body	3	2	1	2
LA1II2_4	Restricted	Neck	3	0	3	3
LA1II2_4	NI	Body	4	0	4	2
LA1II2_4	NI	Rim	1	1	0	0
LA1II2_4	Unrestricted	Base	3	0	3	3
LA1II2_4	Unrestricted	Body	54	24	30	16
LA1II2_4	Unrestricted	Rim/Neck	5	1	4	5
LA1II2_5	Restricted	Body	4	2	2	4
LA1II2_5	Restricted	Neck	1	1	0	1
LA1II2_5	Unrestricted	Base	2	1	1	2
LA1II2_5	Unrestricted	Body	16	13	3	16
LA1II3_11	Restricted	Body	22	15	7	7
LA1II3_11	Restricted	Neck	3	3	0	3
LA1II3_11	NI	Body	26	17	9	9
LA1II3_11	NI	Rim	4	4	0	0
LA1II3_11	Unrestricted	Base	5	1	4	5
LA1II3_11	Unrestricted	Body	403	298	105	123
LA1II3_11	Unrestricted	Body incised	2	1	1	2

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LA1II3_11	Unrestricted	Rim	10	10	0	3
LA1II3_11	Unrestricted	Rim/Neck	19	6	13	19
LA1II3_22	Restricted	Body	6	2	4	4
LA1II3_22	Restricted	Neck	1	0	1	1
LA1II3_22	Restricted	Shoulder	2	0	2	2
LA1II3_22	NI	Body	13	6	7	4
LA1II3_22	NI	Rim	3	2	1	1
LA1II3_22	Unrestricted	Base	2	0	2	2
LA1II3_22	Unrestricted	Body	158	94	64	65
LA1II3_22	Unrestricted	Rim	7	3	4	3
LA1II3_22	Unrestricted	Rim/Neck	3	0	3	3
LA1II3_23	Restricted	Body	22	13	9	10
LA1II3_23	Restricted	Neck	7	1	6	6
LA1II3_23	Restricted	Rim	1	1	0	1
LA1II3_23	Restricted	Shoulder	3	0	3	3
LA1II3_23	NI	Body	24	14	10	8
LA1II3_23	NI	Rim	5	5	0	0
LA1II3_23	NI	Rim/Neck	1	0	1	1
LA1II3_23	Unrestricted	Body	283	207	76	90
LA1II3_23	Unrestricted	Body glazed	1	1	0	1
LA1II3_23	Unrestricted	Rim	9	9	0	3
LA1II3_23	Unrestricted	Rim/Neck	11	7	4	8
LA1II3_24	Restricted	Body	9	3	6	7
LA1II3_24	NI	Body	2	2	0	0
LA1II3_24	Unrestricted	Base	2	0	2	2
LA1II3_24	Unrestricted	Body	65	38	27	24
LA1II3_24	Unrestricted	Rim	2	2	0	0
LA1II3_24	Unrestricted	Rim/Neck	7	1	6	7
LA1II4_31	Restricted	Body	10	5	5	5
LA1II4_31	Restricted	Neck	6	4	2	3
LA1II4_31	Restricted	Rim/Neck	1	0	1	1
LA1II4_31	Unrestricted	Base	3	2	1	3
LA1II4_31	Unrestricted	Body	75	59	16	25
LA1II4_31	Unrestricted	Rim	2	1	1	1
LA1II4_31	Unrestricted	Rim/Neck	5	3	2	5
LA2I10_19	Restricted	Body	2	1	1	1
LA2I10_19	Restricted	Rim/Neck	1	1	0	1
LA2I10_19	NI	Body	4	3	1	1
LA2I10_19	NI	Teja?	18	6	12	3
LA2I10_19	Unrestricted	Body	8	7	1	3
LA2I11_27	Restricted	Body	3	3	0	1
LA2I11_27	NI	Body	3	3	0	0
LA2I11_27	NI	Rim	1	1	0	0
LA2I11_27	NI	Teja?	71	53	18	0
LA2I11_27	Unrestricted	Body	15	14	1	4
LA2I11_27	Unrestricted	Rim	3	3	0	3
LA2II10_20	Restricted	Base	1	1	0	1
LA2II10_20	NI	Body	1	0	1	1
LA2II10_20	NI	Teja?	8	6	2	1
LA2II10_20	Unrestricted	Body	10	9	1	3
LA2III10_21	Restricted	Base	1	1	0	1
LA2III10_21	Restricted	Body	1	1	0	1
LA2III10_21	Restricted	Neck	2	2	0	2
LA2III10_21	NI	Rim	2	2	0	0
LA2III10_21	NI	Teja?	30	21	9	1
LA2III10_21	Unrestricted	Base	2	2	0	2
LA2III10_21	Unrestricted	Body	30	27	3	12
LA2III10_21	Unrestricted	Rim	4	3	1	4
LA2III11_26	Restricted	Body	3	3	0	1
LA2III11_26	Restricted	Rim/Neck	1	1	0	1
LA2III11_26	NI	Body	21	13	8	4
LA2III11_26	NI	Teja?	12	0	12	1
LA2III11_26	Unrestricted	Body	14	13	1	5
LA2III11_26	Unrestricted	Rim	1	1	0	1
LA2V11_35	Unrestricted	Body	4	2	2	4
LA2VI11_55	NI	Teja?	3	0	3	1
LA2VI12_34	Unrestricted	Body	1	0	1	1
LA2VI12_34	Unrestricted	Rim/Neck	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LA3I1_28	Restricted	Body	4	4	0	1
LA3I1_28	Unrestricted	Body	2	1	1	1
LA3I2_36	Restricted	Body	21	6	15	7
LA3I2_36	Restricted	Neck	1	0	1	1
LA3I2_36	NI	Body	12	3	9	4
LA3I2_36	NI	Rim	9	7	2	3
LA3I2_36	NI	Teja?	1	0	1	1
LA3I2_36	Unrestricted	Base	5	2	3	4
LA3I2_36	Unrestricted	Body	99	46	53	33
LA3I2_36	Unrestricted	Rim/Neck	9	0	9	9
LA3I2_48	Restricted	Body	11	2	9	3
LA3I2_48	NI	Body	1	0	1	1
LA3I2_48	Unrestricted	Base	2	1	1	2
LA3I2_48	Unrestricted	Body	33	16	17	11
LA3I2_48	Unrestricted	Body white slip	1	1	0	1
LA3I2_48	Unrestricted	Rim/Neck	1	1	0	1
LA3II4_53	Unrestricted	Body	1	0	1	1
LA3III3_51	Unrestricted	Body	10	6	4	4
LA3III3_51	Unrestricted	Rim/Neck	1	0	1	1
LD???_36/75	Restricted	Base	2	1	1	0
LD???_36/75	Restricted	Body	156	121	35	0
LD???_36/75	Restricted	Body incised	1	1	0	0
LD???_36/75	Restricted	Rim/Neck	2	2	0	0
LD???_36/75	Restricted	Rim/Neck w/incisions	1	1	0	0
LD???_36/75	Restricted	Shoulder	7	3	4	0
LD???_36/75	Restricted	Support	1	1	0	0
LD???_36/75	NI	Body	10	10	0	0
LD???_36/75	NI	Rim	2	2	0	0
LD???_36/75	NI	Support	2	2	0	0
LD???_36/75	Unrestricted	Base	1	0	1	0
LD???_36/75	Unrestricted	Body	158	139	19	0
LD???_36/75	Unrestricted	Body incised	6	5	1	0
LD???_36/75	Unrestricted	Body white slip	6	6	0	0
LD???_36/75	Unrestricted	Rim/Neck	5	4	1	0
LD???_36/75	Unrestricted	Rim/Neck w/incisions	2	1	1	0
LD???_74	Figurine?	Body	3	0	3	0
LD???_74	Unrestricted	Body	1	1	0	0
LD???_74	Unrestricted	Rim/Neck	1	0	1	0
LD1ABXIV5_174	Unrestricted	Rim/Neck w/white slip	1	0	1	1
LD1ABXIV5_177	Restricted	Body	20	13	7	7
LD1ABXIV5_177	Restricted	shoulder incised	1	1	0	1
LD1ABXIV5_177	NI	Rim	1	1	0	1
LD1ABXIV5_177	Unrestricted	Base	1	1	0	1
LD1ABXIV5_177	Unrestricted	Body	28	23	5	8
LD1ABXIV5_177	Unrestricted	Body w/white slip	2	2	0	2
LD1ABXV6_191	Restricted	Body	1	0	1	1
LD1ABXV6_191	Restricted	Shoulder puntuated	1	1	0	1
LD1ABXV6_191	Unrestricted	Body	1	1	0	1
LD1ABXV6_193	Restricted	Body	17	11	6	6
LD1ABXV6_193	Restricted	shoulder	1	0	1	1
LD1ABXV6_193	NI	Body	4	4	0	0
LD1ABXV6_193	Unrestricted	Body	46	35	11	13
LD1ABXV6_193	Unrestricted	Body incised	4	2	2	3
LD1ABXV6_193	Unrestricted	Body white slip	3	3	0	0
LD1ABXV6_193	Unrestricted	Rim	3	2	1	3
LD1ABXV6_193	Unrestricted	Xúmitl	1	1	0	1
LD1ABXVII6_210	Restricted	Body	18	14	4	6
LD1ABXVII6_210	Restricted	body w/white slip	1	0	1	1
LD1ABXVII6_210	Restricted	Neck incised	2	1	1	2
LD1ABXVII6_210	NI	Body	2	2	0	0
LD1ABXVII6_210	Unrestricted	Body	25	20	5	7
LD1ABXVII6_210	Unrestricted	Body incised	1	1	0	1
LD1ABXVII6_210	Unrestricted	Body w/white slip	4	2	2	3
LD1ABXVII6_210	Unrestricted	Body with appliqué	1	0	1	1
LD1AH2_1	NI	Body	1	0	1	0
LD1AII2_4	Restricted	Base	1	1	0	0
LD1AII2_4	Restricted	Body	12	9	3	3
LD1AII2_4	NI	Body	4	4	0	0

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD1AII2_4	NI	NI	2	2	0	1
LD1AII2_4	NI	Rim	1	1	0	1
LD1AII2_4	Unrestricted	Base	2	2	0	0
LD1AII2_4	Unrestricted	Body	27	20	7	7
LD1AII2_4	Unrestricted	NI	1	1	0	0
LD1AII2_4	Unrestricted	Rim/Neck	2	1	1	2
LD1AII2_6	Unrestricted	Body	2	1	1	2
LD1AIIa2_18	Unrestricted	Body	1	0	1	0
LD1AIII2_13	Malacate	Body incised	1	0	1	1
LD1AIII2_14	Restricted	Base	1	0	1	1
LD1AIII2_14	Restricted	Body	139	100	39	17
LD1AIII2_14	Restricted	Body incised	1	1	0	1
LD1AIII2_14	Restricted	Neck	1	0	1	1
LD1AIII2_14	Restricted	Rim	6	4	2	6
LD1AIII2_14	Restricted	Rim/Neck	1	0	1	1
LD1AIII2_14	Restricted	Shoulder	3	0	3	3
LD1AIII2_14	NI	Base	1	1	0	1
LD1AIII2_14	NI	Body	12	11	1	0
LD1AIII2_14	Unrestricted	Base	4	3	1	4
LD1AIII2_14	Unrestricted	Body	165	122	43	18
LD1AIII2_14	Unrestricted	Body incised	1	1	0	1
LD1AIII2_14	Unrestricted	Body white slip	1	1	0	1
LD1AIII2_14	Unrestricted	Body with appliqué	1	0	1	1
LD1AIII2_14	Unrestricted	Rim w/incisions	1	1	0	1
LD1AIII2_14	Unrestricted	Rim/Neck	3	1	2	3
LD1AIII2_14	Unrestricted	Xúmitl	2	2	0	2
LD1AIII2_19	Restricted	Body	3	0	3	3
LD1AIII2_19	Restricted	Shoulder incised	1	0	1	1
LD1AIII2_19	Unrestricted	Body	9	6	3	9
LD1AIII2_20	Restricted	Body	1	0	1	1
LD1AIII2_20	Restricted	Shoulder	1	0	1	1
LD1AIII2_20	NI	Body	1	1	0	1
LD1AIII2_20	Unrestricted	Base	1	0	1	1
LD1AIII2_20	Unrestricted	Body	1	1	0	1
LD1AIII2_21	Restricted	Body	1	0	1	1
LD1AIII2_22	Unrestricted	Body	1	0	1	1
LD1AIII2_23	Restricted	Body	1	1	0	1
LD1AIII2_23	Restricted	Rim/Neck	1	0	1	1
LD1AIII2_23	NI	Body	3	3	0	0
LD1AIII2_23	Unrestricted	Body	2	2	0	0
LD1AIII2_44	Restricted	Base	1	0	1	1
LD1AIII2_44	Unrestricted	Base	1	0	1	1
LD1AIII2_44	Unrestricted	Body	1	1	0	1
LD1AIII2_7	Restricted	Rim/Neck	1	0	1	1
LD1AIII2_8	Restricted	Rim/Neck w/incisions	1	0	1	1
LD1AIII2_9	Restricted	Body	15	12	3	2
LD1AIII2_9	Restricted	Rim	2	1	1	2
LD1AIII2_9	Restricted	Shoulder incised	3	2	1	3
LD1AIII2_9	NI	Body	7	4	3	0
LD1AIII2_9	NI	Rim	1	1	0	1
LD1AIII2_9	NI	Shoulder	1	0	1	1
LD1AIII2_9	Unrestricted	Base	9	6	3	9
LD1AIII2_9	Unrestricted	Body	87	75	12	18
LD1AIII2_9	Unrestricted	Body incised	4	4	0	4
LD1AIII2_9	Unrestricted	Body white slip	1	1	0	1
LD1AIII2_9	Unrestricted	Rim	1	1	0	1
LD1AIII2_9	Unrestricted	Rim/Neck	1	1	0	1
LD1AIIIa2_27	NI	Body	1	0	1	0
LD1AIIIa2_27	Unrestricted	Body	2	1	1	0
LD1AP?_175	Restricted	Body	11	7	4	0
LD1AP?_175	Restricted	Shoulder	1	1	0	1
LD1AP?_175	Restricted	Shoulder incised	1	0	1	1
LD1AP?_175	NI	Body	1	1	0	1
LD1AP?_175	Unrestricted	Body	14	9	5	0
LD1AP?_175	Unrestricted	Body white slip	1	1	0	1
LD1AP?_64	Unrestricted	Body	1	0	1	0
LD1AV2_33	Restricted	Base	1	0	1	1
LD1AV2_33	Restricted	Body	3	0	3	3

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD1AV2_33	Unrestricted	Body	6	4	2	6
LD1AV2_33	Unrestricted	Rim	1	1	0	1
LD1AV2_33	Unrestricted	Rim/Neck	2	0	2	2
LD1AV2_34	Restricted	Body	1	0	1	1
LD1AV2_34	Restricted	Rim/Neck	2	2	0	2
LD1AV2_34	Unrestricted	Rim/Neck w/white slip	1	0	1	1
LD1AV2_35	Restricted	Body	4	2	2	1
LD1AV2_35	Restricted	Shoulder incised	1	0	1	1
LD1AV2_35	NI	Base	1	1	0	1
LD1AV2_35	Unrestricted	Base	2	0	2	2
LD1AV2_35	Unrestricted	Body	10	8	2	5
LD1AV2_35	Unrestricted	Body incised	1	1	0	0
LD1AV3_102	Restricted	Body	1	0	1	
LD1AV3_36	Restricted	Shoulder incised	1	0	1	1
LD1AV3_36	Unrestricted	Body white slip	1	1	0	1
LD1AV3_36	Unrestricted	Body with appliqué	3	1	2	3
LD1AV3_36	Unrestricted	Rim/Neck	2	1	1	2
LD1AV3_36	Unrestricted	Rim/Neck incised	1	0	1	1
LD1AV3_45	Unrestricted	Body	1	0	1	1
LD1AV3_46	Unrestricted	Body	1	0	1	1
LD1AV3_47	Restricted	Body	1	0	1	1
LD1AV3_48	Restricted	Rim/neck incised	1	0	1	1
LD1AV3_49	Unrestricted	Body	1	0	1	1
LD1AV3_51	Unrestricted	Body	1	0	1	1
LD1AV3_52	NI	Body	1	1	0	1
LD1AV3_52	Unrestricted	Base	1	0	1	1
LD1AV3_52	Unrestricted	Rim	1	0	1	1
LD1AV3_53	Unrestricted	Body	1	0	1	1
LD1AV3_54	Unrestricted	Body	1	0	1	1
LD1AV3_55	Restricted	Body	1	0	1	1
LD1AV3_56	Restricted	Shoulder	1	0	1	1
LD1AV3_57	Unrestricted	Rim/Neck incised	1	0	1	1
LD1AV3_58	Restricted	Body	1	0	1	1
LD1AV3_59	Unrestricted	Body	1	0	1	1
LD1AV3_60	Unrestricted	Body	1	0	1	1
LD1AV3_61	Unrestricted	Body	1	0	1	1
LD1AV3_62	Unrestricted	Body	1	0	1	1
LD1AV3_65	Restricted	Body	19	13	6	6
LD1AV3_65	Restricted	Shoulder incised	1	0	1	1
LD1AV3_65	NI	Body	1	1	0	0
LD1AV3_65	NI	NI	1	1	0	0
LD1AV3_65	NI	Rim	1	1	0	1
LD1AV3_65	Unrestricted	Body	22	14	8	7
LD1AV3_65	Unrestricted	Body incised	2	0	2	2
LD1AV3_65	Unrestricted	Body white slip	3	3	0	3
LD1AV3_65	Unrestricted	Rim/Neck w/white slip	2	1	1	2
LD1AV3_69	Unrestricted	Rim/Neck	1	0	1	1
LD1AV3_70	Restricted	Body	1	0	1	1
LD1AV3_73	Restricted	Body	7	5	2	1
LD1AV3_73	NI	Body	4	3	1	0
LD1AV3_73	Unrestricted	Body	15	7	8	2
LD1AV3_73	Unrestricted	Body white slip	1	1	0	0
LD1AVa2_76	Restricted	Body	5	0	5	0
LD1AVa2_76	Restricted	Neck	1	0	1	0
LD1AVa2_76	NI	Body	2	2	0	0
LD1AVa2_76	Unrestricted	Body	2	0	2	0
LD1AVa3_90	Restricted	Base	2	0	2	0
LD1AVa3_90	Restricted	Body	1	1	0	0
LD1AVa3_90	NI	Body	2	2	0	0
LD1AVa3_90	Unrestricted	Body	5	5	0	0
LD1AVb3_92	Restricted	Base	1	0	1	0
LD1AVb3_92	Restricted	Body	1	1	0	0
LD1AVb3_92	Unrestricted	Body	3	0	3	0
LD1AVb3_92	Unrestricted	Body w/white slip	1	0	1	0
LD1AVI3_111	Restricted	Body	1	0	1	1
LD1AVI3_111	Unrestricted	Body	1	1	0	1
LD1AVI3_111	Unrestricted	Body white slip	1	0	1	1
LD1AVI3_82	Restricted	Body	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD1AVI3_83	Unrestricted	Body appliqué	1	0	1	1
LD1AVI3_84	Unrestricted	Body w/white slip	1	0	1	1
LD1AVI3_85	Unrestricted	Body	2	1	1	2
LD1AVI3_86	Restricted	Body	1	0	1	1
LD1AVI3_87	Restricted	Body	23	16	7	3
LD1AVI3_87	Restricted	Body incised	1	1	0	1
LD1AVI3_87	Restricted	Rim/Neck	1	0	1	1
LD1AVI3_87	Restricted	Rim/neck incised	1	0	1	1
LD1AVI3_87	Restricted	Rim/Neck w/white slip	1	0	1	1
LD1AVI3_87	Restricted	Shoulder			1	1
LD1AVI3_87	NI	Body	6	6	0	0
LD1AVI3_87	NI	Rim	1	1	0	1
LD1AVI3_87	Unrestricted	Body	39	30	9	11
LD1AVI3_87	Unrestricted	Body incised	3	2	1	3
LD1AVI3_87	Unrestricted	Body white slip	5	2	3	5
LD1AVI3_87	Unrestricted	Rim w/white slip	1	1	0	1
LD1AVI3_87	Unrestricted	Rim/Neck	2	2	0	2
LD1AVI3_87	Unrestricted	Rim/Neck incised white slip	1	0	1	1
LD1AVI4_114	Restricted	Body	30	21	9	9
LD1AVI4_114	Restricted	Rim/Neck incised	1	0	1	1
LD1AVI4_114	Restricted	Rim/Neck incised white slip	1	0	1	1
LD1AVI4_114	NI	Body	6	6	0	0
LD1AVI4_114	NI	Body w/white slip	1	1	0	1
LD1AVI4_114	Unrestricted	Base	1	0	1	1
LD1AVI4_114	Unrestricted	Body	27	19	8	8
LD1AVI4_114	Unrestricted	Body incised	1	1	0	0
LD1AVI4_114	Unrestricted	Body w/white slip	4	3	1	2
LD1AVI4_114	Unrestricted	NI	1	1	0	1
LD1AVI4_114	Unrestricted	Rim/Neck	1	0	1	1
LD1AVI4_114	Unrestricted	Xúmitl	1	1	0	1
LD1AVI4_118	Malacate	Body	1	0	1	1
LD1AVI4_119	Restricted	Body	32	27	5	10
LD1AVI4_119	Restricted	Rim/Neck	3	3	0	3
LD1AVI4_119	Restricted	Shoulder incised	2	2	0	2
LD1AVI4_119	NI	Body	2	2	0	0
LD1AVI4_119	NI	Rim	2	2	0	2
LD1AVI4_119	Unrestricted	Base	1	1	0	1
LD1AVI4_119	Unrestricted	Body	32	21	11	10
LD1AVI4_119	Unrestricted	Body incised	1	1	0	1
LD1AVI4_119	Unrestricted	Body white slip	5	5	0	2
LD1AVI4_119	Unrestricted	Rim	1	1	0	1
LD1AVI4_119	Unrestricted	Rim/Neck	1	1	0	1
LD1AVI4_119	Unrestricted	Rim/neck incised	1	1	0	1
LD1AVI4_97	Restricted	Body	44	29	15	14
LD1AVI4_97	Restricted	Body incised	1	1	0	1
LD1AVI4_97	Restricted	Rim/Neck	1	1	0	1
LD1AVI4_97	Restricted	Rim/Neck incised white slip	1	0	1	1
LD1AVI4_97	Restricted	shoulder	1	1	0	1
LD1AVI4_97	Restricted	Shoulder incised	1	1	0	1
LD1AVI4_97	NI	Body	5	4	1	0
LD1AVI4_97	NI	Rim	1	0	1	0
LD1AVI4_97	NI	Rim/neck incised	1	1	0	1
LD1AVI4_97	Unrestricted	Base w/white slip	1	0	1	1
LD1AVI4_97	Unrestricted	Body	55	46	9	12
LD1AVI4_97	Unrestricted	Body white slip	4	4	0	4
LD1AVI4_97	Unrestricted	Rim	2	2	0	2
LD1AVI4_97	Unrestricted	Rim w/white slip	1	0	1	1
LD1AVI4_97	Unrestricted	Rim/Neck w/white slip	1	0	1	1
LD1AVI4_97	Unrestricted	Support	1	0	1	1
LD1AVIa3_124	Restricted	Base	1	1	0	0
LD1AVIa3_124	Restricted	Body	3	2	1	0
LD1AVIa3_124	Unrestricted	Body	7	6	1	0
LD1AVIa4_126	Restricted	Body	8	5	3	0
LD1AVIa4_126	Restricted	Shoulder	1	1	0	0
LD1AVIa4_126	Restricted	Shoulder incised	1	0	1	0
LD1AVIa4_126	NI	Body	1	1	0	0
LD1AVIa4_126	Unrestricted	Base	1	1	0	0
LD1AVIa4_126	Unrestricted	Body	8	5	3	0

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD1AVIa4_126	Unrestricted	Body white slip	1	1	0	0
LD1AVIb3_106	Restricted	Body	7	4	3	0
LD1AVIb3_106	Unrestricted	Body	6	5	1	0
LD1AXI4_136	Unrestricted	Body	1	0	1	1
LD1AXI5_137	Restricted	Base	5	1	4	5
LD1AXI5_137	Restricted	Body	26	13	13	7
LD1AXI5_137	Restricted	Body with appliqué	1	0	1	1
LD1AXI5_137	NI	Body	4	0	4	4
LD1AXI5_137	Unrestricted	Base	2	0	2	2
LD1AXI5_137	Unrestricted	Body	26	16	10	7
LD1AXI5_137	Unrestricted	Body w/white slip	2	2	0	1
LD1AXI5_146	Restricted	Base	1	0	1	1
LD1AXI5_146	Restricted	Body	46	30	16	12
LD1AXI5_146	Restricted	Rim/Neck	1	1	0	1
LD1AXI5_146	Restricted	shoulder	2	2	0	0
LD1AXI5_146	Restricted	Shoulder incised	4	3	1	3
LD1AXI5_146	Restricted	Xúmitl Shoulder	1	1	0	1
LD1AXI5_146	NI	Body	6	6	0	6
LD1AXI5_146	Unrestricted	Base	5	5	0	1
LD1AXI5_146	Unrestricted	Body	116	94	22	27
LD1AXI5_146	Unrestricted	Body incised	2	2	0	2
LD1AXI5_146	Unrestricted	Body w/white slip	1	0	1	1
LD1AXI5_146	Unrestricted	Rim	1	1	0	1
LD1AXI5_146	Unrestricted	Rim/Neck	4	3	1	4
LD1AXI5_146	Unrestricted	Rim/Neck w/incisions	2	1	1	2
LD1AXI5_146	Unrestricted	Rim/Neck w/white slip	1	1	0	1
LD1AXIa5_186	Restricted	Body	5	3	2	0
LD1AXIa5_186	Unrestricted	Base	1	0	1	0
LD1AXIa5_186	Unrestricted	Body	4	3	1	0
LD1AXIa5_186	Unrestricted	Body white slip	1	1	0	0
LD1AXIV5_154	Restricted	Body	1	0	1	1
LD1AXIV5_155	Unrestricted	Rim/Neck w/appliqué	1	0	1	1
LD1AXIV5_156	Restricted	Body	1	1	0	1
LD1AXIV5_156	Unrestricted	Body	1	0	1	1
LD1AXIV5_159	Unrestricted	Body	1	0	1	1
LD1AXIV5_160	Unrestricted	Body	1	0	1	1
LD1AXIV5_161	Unrestricted	Body incised w/appliqué	1	0	1	1
LD1AXIV5_162	Restricted	Body	1	0	1	1
LD1AXIV5_163	Restricted	Body	1	0	1	1
LD1AXIV5_164	Unrestricted	Rim/Neck	1	0	1	1
LD1AXIV5_165	Unrestricted	Rim/Neck w/white slip	1	0	1	1
LD1AXIV5_166	Unrestricted	Base	1	0	1	1
LD1AXIV5_167	Unrestricted	Body	1	0	1	1
LD1AXIV5_168	Unrestricted	Rim/neck incised	1	0	1	1
LD1AXIV5_169	Restricted	Body	1	0	1	1
LD1AXIV5_170	Restricted	Body	1	0	1	1
LD1AXIV5_171	Restricted	Body	1	0	1	1
LD1AXIV5_172	Restricted	Body	4	2	2	4
LD1AXIV5_180	Restricted	Base	1	1	0	1
LD1AXIV5_180	Restricted	Body	55	29	26	15
LD1AXIV5_180	Restricted	Body incised	1	0	1	1
LD1AXIV5_180	Restricted	Shoulder incised	4	1	3	4
LD1AXIV5_180	Restricted	Xúmitl	1	1	0	1
LD1AXIV5_180	NI	Body	7	5	2	7
LD1AXIV5_180	NI	Shoulder?	1	1	0	0
LD1AXIV5_180	Unrestricted	Base	2	1	1	2
LD1AXIV5_180	Unrestricted	Base incised	2	1	1	2
LD1AXIV5_180	Unrestricted	Body	67	52	15	14
LD1AXIV5_180	Unrestricted	body w/white slip	1	1	0	0
LD1AXIV5_180	Unrestricted	Rim w/incisions	1	1	0	1
LD1AXIV5_180	Unrestricted	Rim/Neck	3	1	2	3
LD1AXIV5_180	Unrestricted	Rim/Neck incised	4	1	3	4
LD1AXIV5_180	Unrestricted	Rim/Neck w/white slip	2	0	2	2
LD1AXV6_189	Restricted	Base	3	1	2	3
LD1AXV6_189	Restricted	Body	40	28	12	10
LD1AXV6_189	Restricted	Shoulder incised	2	1	1	2
LD1AXV6_189	NI	Body	5	5	0	0
LD1AXV6_189	NI	Handle	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD1AXV6_189	NI	Support	1	1	0	1
LD1AXV6_189	Unrestricted	Base	1	1	0	1
LD1AXV6_189	Unrestricted	Body	102	89	13	25
LD1AXV6_189	Unrestricted	Body incised	2	2	0	2
LD1AXV6_189	Unrestricted	Body white slip	6	5	1	4
LD1AXV6_189	Unrestricted	NI	1	1	0	1
LD1AXV6_189	Unrestricted	Rim	1	1	0	1
LD1AXV6_189	Unrestricted	Rim/Neck	1	1	0	1
LD1AXV6_189	Unrestricted	Rim/Neck incised	1	1	0	1
LD1AXV6_189	Unrestricted	Rim/Neck w/white slip	2	2	0	2
LD1AXV6_189	Unrestricted	Xúmitl	1	1	0	1
LD1AXV6_197	Restricted	Rim/Neck incised	1	0	1	1
LD1AXV6_198	Unrestricted	Body	1	0	1	1
LD1AXV6_200	Restricted	Body	26	18	8	6
LD1AXV6_200	Restricted	Shoulder	3	3	0	3
LD1AXV6_200	NI	Body	4	4	0	0
LD1AXV6_200	NI	Rim w/incisions	1	1	0	1
LD1AXV6_200	NI	Support white slip	1	0	1	1
LD1AXV6_200	Unrestricted	Base	6	4	2	6
LD1AXV6_200	Unrestricted	Base w/white slip	1	1	0	1
LD1AXV6_200	Unrestricted	Body	68	55	13	18
LD1AXV6_200	Unrestricted	Body incised	3	1	2	3
LD1AXV6_200	Unrestricted	Body w/white slip	6	6	0	6
LD1AXV6_200	Unrestricted	Rim w/incisions	1	1	0	1
LD1AXV6_200	Unrestricted	Rim/Neck w/white slip	1	0	1	1
LD1AXV6_200	Unrestricted	Xúmitl	2	2	0	2
LD1AXV6_207	Restricted	Body	4	3	1	0
LD1AXVIa5_204	Restricted	Body	4	4	0	0
LD1AXVIa5_204	Unrestricted	Body	1	0	1	0
LD1AXVII6_208	Restricted	Base	1	0	1	1
LD1AXVII6_208	Restricted	Body	20	12	8	2
LD1AXVII6_208	Restricted	Shoulder	3	2	1	3
LD1AXVII6_208	NI	Body	7	5	2	
LD1AXVII6_208	NI	Body incised	1	1	0	1
LD1AXVII6_208	NI	Rim	1	1	0	1
LD1AXVII6_208	NI	Support	1	0	1	1
LD1AXVII6_208	Unrestricted	Base	6	3	3	6
LD1AXVII6_208	Unrestricted	Body	118	100	18	24
LD1AXVII6_208	Unrestricted	Body incised	5	5	0	5
LD1AXVII6_208	Unrestricted	Body white slip	6	6	0	6
LD1AXVII6_208	Unrestricted	Rim/Neck	4	1	3	4
LD1AXVII6_208	Unrestricted	Rim/Neck incised white slip	1	0	1	1
LD1AXVII6_208	Unrestricted	Rim/Neck w/white slip	2	1	1	2
LD1BII1_25	Restricted	Body	5	3	2	0
LD1BII1_25	Restricted	Body incised	1	1	0	0
LD1BII1_25	NI	Body	4	4	0	0
LD1BII1_25	NI	Rim	1	1	0	0
LD1BII1_25	Unrestricted	Base	1	1	0	0
LD1BII1_25	Unrestricted	Body	21	17	4	0
LD1BII1_25	Unrestricted	Body incised	1	1	0	0
LD1BII1_25	Unrestricted	Rim	1	1	0	0
LD1BIII2_29	Unrestricted	Base	1	1	0	1
LD1BIII2_29	Unrestricted	Base w/white slip	1	0	1	1
LD1BIII2_29	Unrestricted	Body	6	6	0	6
LD1BIII2_29	Unrestricted	Rim/Neck	1	0	1	1
LD1BIII2_30	Restricted	Base	2	2	0	2
LD1BIII2_30	Restricted	Body	34	24	10	10
LD1BIII2_30	Restricted	Body incised	1	1	0	1
LD1BIII2_30	Restricted	Rim	1	1	0	1
LD1BIII2_30	Restricted	Shoulder	1	0	1	1
LD1BIII2_30	Restricted	shoulder incised	1	0	1	1
LD1BIII2_30	NI	Body	5	5	0	0
LD1BIII2_30	NI	Xúmitl	1	1	0	1
LD1BIII2_30	Unrestricted	Base	6	4	2	6
LD1BIII2_30	Unrestricted	Body	88	77	11	27
LD1BIII2_30	Unrestricted	Body incised	3	3	0	3
LD1BIII2_30	Unrestricted	Body white slip	1	1	0	1
LD1BV3_39	Restricted	Body	14	10	4	4

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD1BV3_39	Restricted	Shoulder	1	0	1	1
LD1BV3_39	NI	Body w/white slip	1	1	0	1
LD1BV3_39	Unrestricted	Base	1	1	0	1
LD1BV3_39	Unrestricted	Bdoy	9	6	3	3
LD1BV3_39	Unrestricted	Body incised	1	1	0	1
LD1BV3_39	Unrestricted	Body w/white slip	1	1	0	1
LD1BV3_39	Unrestricted	Rim/Neck	2	1	1	2
LD1BV3_42	Restricted	Body	1	0	1	1
LD1BV3_50	Unrestricted	Rim/Neck incised	1	0	1	1
LD1BV3_78			0	0	0	0
LD1BV3_78	Restricted	Body	3	3	0	0
LD1BV3_78	Unrestricted	Body	4	2	2	0
LD1BV3_78	Unrestricted	Rim/Neck incised white slip	1	0	1	1
LD1BVI3_115	Restricted	Body	7	4	3	2
LD1BVI3_115	NI	Body	1	1	0	0
LD1BVI3_115	Unrestricted	Body	5	3	2	2
LD1BVI3_115	Unrestricted	Body incised	1	1	0	1
LD1BVI3_93	Restricted	Body	4	1	3	1
LD1BVI3_93	Restricted	Rim/Neck	1	0	1	1
LD1BVI3_93	Restricted	Shoulder	1	1	0	0
LD1BVI3_93	Unrestricted	Body	5	5	0	0
LD1BVI3_93	Unrestricted	Body w/white slip	1	1	0	1
LD1BVI4_104	Restricted	Base	1	0	1	1
LD1BVI4_104	Restricted	Body	14	6	8	4
LD1BVI4_104	Restricted	Body w/white slip	1	1	0	1
LD1BVI4_104	Restricted	Rim/Neck	1	1	0	1
LD1BVI4_104	NI	Body	4	4	0	0
LD1BVI4_104	Unrestricted	Base	1	1	0	1
LD1BVI4_104	Unrestricted	Body	11	9	2	2
LD1BVI4_104	Unrestricted	Body w/white slip	2	2	0	1
LD1BVI4_104	Unrestricted	Rim w/white slip	2	2	0	2
LD1BVI4_104	Unrestricted	Rim/Neck	2	1	1	2
LD1BVI4_104	Unrestricted	Rim/Neck incised	1	0	1	1
LD1BVI4_104	Unrestricted	Xúmitl	1	1	0	0
LD1BVI4_129	Restricted	Body	12	8	4	2
LD1BVI4_129	NI	Body	2	2	0	1
LD1BVI4_129	Unrestricted	Body	6	2	4	2
LD1BVI4_129	Unrestricted	Body incised	1	1	0	1
LD1BVI4_95	Unrestricted	Support white slip			1	1
LD1BXI4_133	Restricted	Body	2	0	2	1
LD1BXI4_133	Restricted	Shoulder incised	1	0	1	1
LD1BXI4_133	Unrestricted	Body	7	4	3	2
LD1BXI4_133	Unrestricted	Body w/white slip	1	1	0	1
LD1BXI4_133	Unrestricted	Rim/Neck w/white slip	1	0	1	1
LD1BXI4_135	Restricted	Body incised w/appliqué	1	0	1	1
LD1BXI5_138	Restricted	Body	2	0	2	1
LD1BXI5_138	Restricted	Rim/Neck incised	1	0	1	1
LD1BXI5_138	Unrestricted	Body	13	7	6	4
LD1BXI5_138	Unrestricted	Rim/Neck	1	0	1	1
LD1BXI5_138	Unrestricted	Rim/Neck incised	1	1	0	1
LD1BXI5_141	Restricted	Body incised	1	1	0	1
LD1BXI5_141	Restricted	Rim/Neck incised	1	0	1	1
LD1BXI5_149	Restricted	Body	13	10	3	3
LD1BXI5_149	Restricted	Shoulder	2	1	1	1
LD1BXI5_149	NI	Body	2	2	0	0
LD1BXI5_149	Unrestricted	Body	38	32	6	5
LD1BXI5_149	Unrestricted	body w/white slip	1	1	0	0
LD1BXIV5_173	Unrestricted	Body	1	0	1	1
LD1BXIV5_184	Restricted	Base	2	2	0	0
LD1BXIV5_184	Restricted	Body	10	3	7	3
LD1BXIV5_184	NI	Body	1	1	0	0
LD1BXIV5_184	NI	Rim	1	1	0	1
LD1BXIV5_184	Unrestricted	Base	1	1	0	1
LD1BXIV5_184	Unrestricted	Body	15	14	1	3
LD1BXIV5_184	Unrestricted	Body white slip	1	1	0	0
LD1BXV6_195	Restricted	Body	28	20	8	5
LD1BXV6_195	Restricted	Body w/white slip	2	2	0	2
LD1BXV6_195	Restricted	Rim/Neck	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD1BXV6_195	Restricted	Shoulder incised	1	0	1	1
LD1BXV6_195	NI	Body	3	3	0	0
LD1BXV6_195	Unrestricted	Body	17	11	6	3
LD1BXV6_195	Unrestricted	Body w/white slip	7	6	1	4
LD1BXV6_195	Unrestricted	Rim	1	1	0	1
LD1BXV6_195	Unrestricted	Rim/Neck w/white slip	2	1	1	2
LD1BXV6_195	Unrestricted	Xúmitl	2	1	1	2
LD1BXV6_199	Unrestricted	Body	1	0	1	1
LD1BXVII6_212	Restricted	Body	1	0	1	1
LD1BXVII6_212	Unrestricted	Body	12	9	3	4
LD1MP?_223	Restricted	Body	11	9	2	0
LD1MP?_223	Restricted	Shoulder	1	1	0	0
LD1MP?_223	Restricted	Support	1	1	0	0
LD1MP?_223	NI	Body	4	2	2	4
LD1MP?_223	Unrestricted	Body	31	21	10	0
LD1MP?_223	Unrestricted	Body incised	2	1	1	0
LD1MP?_223	Unrestricted	Rim/Neck	1	0	1	0
LD1MP?_223	Unrestricted	Rim/Neck w/incisions	1	0	1	0
LD1P?_225	Restricted	Body	30	23	7	0
LD1P?_225	Restricted	Body incised	1	0	1	0
LD1P?_225	NI	Support	1	1	0	0
LD1P?_225	Unrestricted	Base	1	0	1	0
LD1P?_225	Unrestricted	Body	51	38	13	0
LD1P?_225	Unrestricted	Body incised	3	3	0	0
LD1P?_225	Unrestricted	Body white slip	1	1	0	0
LD1P?_225	Unrestricted	Rim/Neck	1	0	1	0
LD1XVII7_214	Restricted	Base	3	1	2	3
LD1XVII7_214	Restricted	Body	23	15	8	6
LD1XVII7_214	Restricted	Rim	1	1	0	1
LD1XVII7_214	Restricted	Rim/Neck incised	1	0	1	1
LD1XVII7_214	Restricted	Shoulder	2	2	0	2
LD1XVII7_214	Restricted	Shoulder incised	3	1	2	3
LD1XVII7_214	Restricted	Xúmitl Rim/Neck	1	0	1	1
LD1XVII7_214	NI	Body	7	6	1	0
LD1XVII7_214	NI	Body W/white slip	2	2	0	2
LD1XVII7_214	NI	NI	2	1	1	0
LD1XVII7_214	NI	Rim	3	3	0	3
LD1XVII7_214	Unrestricted	Base	6	3	3	6
LD1XVII7_214	Unrestricted	Base w/white slip	1	0	1	1
LD1XVII7_214	Unrestricted	Body	126	98	28	26
LD1XVII7_214	Unrestricted	Body incised	2	1	1	2
LD1XVII7_214	Unrestricted	Body w/white slip	9	6	3	9
LD1XVII7_214	Unrestricted	Rim/Neck	2	2	0	1
LD1XVII7_214	Unrestricted	Support white slip	1	0	1	1
LD1XVII7_216	NI	Support	1	0	1	1
LD1XVII7_217	Restricted	Base	2	1	1	2
LD1XVII7_217	Restricted	Body	35	20	15	9
LD1XVII7_217	Restricted	Body appliqué	1	1	0	1
LD1XVII7_217	Restricted	Body incised	1	1	0	1
LD1XVII7_217	Restricted	Body white slip	1	1	0	1
LD1XVII7_217	Restricted	Body White Slip Incised	1	1	0	1
LD1XVII7_217	Restricted	Rim/Neck	2	1	1	2
LD1XVII7_217	Restricted	Shoulder	2	0	2	2
LD1XVII7_217	NI	Body	6	6	0	0
LD1XVII7_217	NI	Rim	4	4	0	4
LD1XVII7_217	Unrestricted	Base	5	2	3	5
LD1XVII7_217	Unrestricted	Body	128	100	28	26
LD1XVII7_217	Unrestricted	Body incised	4	2	2	4
LD1XVII7_217	Unrestricted	Body white slip	2	2	0	2
LD1XVII7_217	Unrestricted	Rim/Neck	5	3	2	5
LD1XVII7_217	Unrestricted	Rim/Neck w/white slip	1	0	1	1
LD1XVII7_217	Unrestricted	Support white slip	1	1	0	1
LD1XX7_221	Restricted	Body	16	13	3	2
LD1XX7_221	Restricted	Rim/Neck	1	1	0	1
LD1XX7_221	NI	Body	6	5	1	0
LD1XX7_221	NI	Rim	1	0	1	0
LD1XX7_221	Unrestricted	Base	1	0	1	1
LD1XX7_221	Unrestricted	Body	46	39	7	6

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD1XX7_221	Unrestricted	Body w/white slip	3	2	1	1
LD1XX7_221	Unrestricted	Body White Slip Incised	1	1	0	1
LD1XX7_221	Unrestricted	Rim w/white slip	1	0	1	1
LD1XX7_221	Unrestricted	Rim/Neck	2	0	2	2
LD2H1_1	Restricted	Body	5	4	1	5
LD2H1_1	Unrestricted	Body	1	0	1	1
LD2I1_3	Restricted	Body	14	11	3	3
LD2I1_3	Restricted	Shoulder	1	1	0	0
LD2I1_3	Restricted	Shoulder incised	1	1	0	1
LD2I1_3	NI	Body	1	1	0	0
LD2I1_3	Unrestricted	Body	1	0	1	1
LD2II2_10	Restricted	Body	103	71	32	20
LD2II2_10	Restricted	Body incised	1	0	1	1
LD2II2_10	Restricted	Neck	5	4	1	1
LD2II2_10	Restricted	Neck incised	2	2	0	2
LD2II2_10	Restricted	Rim/Neck	4	2	2	4
LD2II2_10	Restricted	Rim/Neck w/incisions	1	0	1	1
LD2II2_10	Restricted	Shoulder	3	1	2	2
LD2II2_10	Restricted	Shoulder incised	1	0	1	1
LD2II2_10	NI	Body	53	52	1	0
LD2II2_10	NI	Rim	1	1	0	0
LD2II2_10	Unrestricted	Base	3	1	2	2
LD2II2_10	Unrestricted	Body	122	100	22	24
LD2II2_10	Unrestricted	Body incised	2	0	2	2
LD2II2_10	Unrestricted	Body white slip	1	1	0	1
LD2II2_10	Unrestricted	Rim/Neck	9	5	4	9
LD2II2_10	Unrestricted	Rim/Neck w/white slip	1	0	1	1
LD2II2_10	Unrestricted	Xúmitl	1	1	0	1
LD2II2_12	Restricted	Body	51	30	21	10
LD2II2_12	Restricted	Rim	1	0	1	1
LD2II2_12	Restricted	Rim/Neck	1	0	1	1
LD2II2_12	NI	Body	2	2	0	0
LD2II2_12	Unrestricted	Base	1	1	0	1
LD2II2_12	Unrestricted	Body	21	17	4	4
LD2II2_12	Unrestricted	Body incised	3	1	2	3
LD2II2_13	Unrestricted	Xúmitl	1	0	1	1
LD2II2_14	Restricted	Body	21	16	5	4
LD2II2_14	Restricted	Neck	1	1	0	1
LD2II2_14	Restricted	Neck incised	1	0	1	1
LD2II2_14	Restricted	Rim/Neck	1	0	1	1
LD2II2_14	Restricted	Shoulder incised	1	0	1	1
LD2II2_14	Unrestricted	Body	14	8	6	4
LD2II2_14	Unrestricted	Body incised	1	1	0	1
LD2II2_14	Unrestricted	Body white slip	1	1	0	1
LD2II2_6	Restricted	Body	64	35	29	13
LD2II2_6	Restricted	Neck	1	0	1	1
LD2II2_6	Restricted	Neck incised	2	2	0	2
LD2II2_6	Restricted	Rim/Neck	1	0	1	1
LD2II2_6	Restricted	Shoulder	2	0	2	2
LD2II2_6	NI	Body	3	2	1	0
LD2II2_6	Unrestricted	Base	1	0	1	1
LD2II2_6	Unrestricted	Body	19	14	5	4
LD2II2_6	Unrestricted	Rim/Neck	1	0	1	1
LD2II2_6	Unrestricted	Rim/Neck incised white slip	1	0	1	1
LD2III3_17	Restricted	Xúmitl	1	0	1	1
LD2III3_17	Unrestricted	Xúmitl	1	1	0	1
LD2III3_18	Restricted	Body	99	65	34	20
LD2III3_18	Restricted	Body incised punctuated	0	0	0	0
LD2III3_18	Restricted	Neck	1	0	1	1
LD2III3_18	Restricted	Neck incised	2	0	2	2
LD2III3_18	Restricted	Rim/Neck	3	1	2	3
LD2III3_18	Restricted	Rim/Neck w/incisions	1	0	1	1
LD2III3_18	Restricted	Shoulder	3	3	0	1
LD2III3_18	NI	Body	13	12	1	0
LD2III3_18	NI	Body incised	1	1	0	1
LD2III3_18	Unrestricted	Base	3	1	2	2
LD2III3_18	Unrestricted	Body	57	38	19	12
LD2III3_18	Unrestricted	Body white slip	2	2	0	2

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD2III3_18	Unrestricted	Rim/Neck	3	2	1	3
LD2III3_18	Unrestricted	Rim/Neck w/white slip	1	1	0	1
LD2III3_21	Restricted	Body	30	17	13	6
LD2III3_21	Restricted	Rim/Neck	2	0	2	2
LD2III3_21	Restricted	Shoulder	3	1	2	1
LD2III3_21	Unrestricted	Base	4	2	2	2
LD2III3_21	Unrestricted	Body	13	7	6	3
LD2III3_21	Unrestricted	Rim/Neck	1	0	1	1
LD2III3_21	Unrestricted	Xúmitl	2	2	0	2
LD2III3_22	Bead	NA	1	1	0	1
LD2III3_24	Restricted	Base	3	2	1	3
LD2III3_24	Restricted	Body	68	45	23	13
LD2III3_24	Restricted	Neck	3	2	1	1
LD2III3_24	Restricted	Neck incised	1	1	0	1
LD2III3_24	Restricted	Rim/Neck	4	2	2	4
LD2III3_24	Restricted	Rim/Neck w/incisions	3	1	2	3
LD2III3_24	Restricted	Shoulder	3	1	2	2
LD2III3_24	Restricted	Shoulder incised	2	1	1	2
LD2III3_24	NI	Body	2	2	0	0
LD2III3_24	NI	Rim/Neck w/white slip	1	1	0	1
LD2III3_24	Unrestricted	Base	4	1	3	3
LD2III3_24	Unrestricted	Base w/white slip	1	1	0	1
LD2III3_24	Unrestricted	Body	75	59	16	15
LD2III3_24	Unrestricted	Body incised	4	3	1	4
LD2III3_24	Unrestricted	Rim/Neck	5	3	2	5
LD2III3_24	Unrestricted	Xúmitl	1	1	0	1
LD2III3_28	Restricted	Base	2	0	2	2
LD2III3_28	Restricted	Body	105	44	61	21
LD2III3_28	Restricted	Neck	2	0	2	2
LD2III3_28	Restricted	Neck incised	1	0	1	1
LD2III3_28	Restricted	Rim	2	2	0	2
LD2III3_28	Restricted	Rim/Neck	2	0	2	2
LD2III3_28	Restricted	Shoulder	2	0	2	2
LD2III3_28	NI	Base	1	0	1	1
LD2III3_28	NI	Body incised	1	1	0	1
LD2III3_28	Unrestricted	Base	2	0	2	2
LD2III3_28	Unrestricted	Body	61	34	27	12
LD2III3_28	Unrestricted	Body incised	1	0	1	1
LD2III3_28	Unrestricted	Rim/Neck	6	2	4	6
LD2III3_28	Unrestricted	Xúmitl	2	2	0	2
LD2III3_29	Bead	NA	1	0	1	1
LD2III3_33	Restricted	Body	166	109	57	32
LD2III3_33	Restricted	Body incised	2	2	0	2
LD2III3_33	Restricted	Neck	3	1	2	2
LD2III3_33	Restricted	Neck incised	2	0	2	2
LD2III3_33	Restricted	Rim/Neck	5	2	3	5
LD2III3_33	Restricted	Rim/Neck w/incisions	4	3	1	4
LD2III3_33	Restricted	Shoulder	6	1	5	2
LD2III3_33	NI	Base	2	2	0	0
LD2III3_33	NI	Body	9	9	0	0
LD2III3_33	NI	Rim	1	0	1	1
LD2III3_33	NI	Xúmitl	2	2	0	2
LD2III3_33	Unrestricted	Base	6	3	3	3
LD2III3_33	Unrestricted	Body	76	49	27	15
LD2III3_33	Unrestricted	Body incised	3	3	0	3
LD2III3_33	Unrestricted	Body white slip	1	0	1	1
LD2III3_33	Unrestricted	Rim/Neck	6	2	4	6
LD2III3_33	Unrestricted	Rim/Neck w/white slip	1	0	1	1
LD2III3_33	Unrestricted	Xúmitl	1	1	0	1
LD2III3_34	Restricted	Body	1	0	1	1
LD2III3_35	Restricted	Body	1	0	1	1
LD2III3_36	Restricted	Body	1	0	1	1
LD2III3_37	Unrestricted	Body	1	0	1	1
LD2III3_38	Restricted	Rim/Neck w/incisions	1	0	1	1
LD2III3_39	Restricted	Body	1	0	1	1
LD2III3_40	Restricted	Body	1	0	1	0
LD2III3_41	Restricted	Body	1	0	1	1
LD2III3_42	Unrestricted	Body	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD2III3_43	NI	Rim	1	0	1	1
LD2III3_44	Restricted	Body	1	0	1	1
LD2III3_45	Restricted	Body	1	0	1	1
LD2III3_45	Restricted	Body appliqué	1	0	1	1
LD2III34_23	Restricted	Body	1	0	1	1
LD2III4_46	Restricted	Body	126	55	71	26
LD2III4_46	Restricted	Rim/Neck	2	1	1	2
LD2III4_46	Restricted	Rim/Neck w/incisions	2	1	1	2
LD2III4_46	Restricted	Shoulder	5	1	4	3
LD2III4_46	NI	Body	10	10	0	0
LD2III4_46	NI	Body incised	1	0	1	1
LD2III4_46	Unrestricted	Base	3	0	3	3
LD2III4_46	Unrestricted	Body	53	27	26	10
LD2III4_46	Unrestricted	Body incised	3	3	0	3
LD2III4_46	Unrestricted	Body white slip	4	3	1	4
LD2III4_46	Unrestricted	Rim/Neck	4	0	4	4
LD2III4_46	Unrestricted	Xúmitl	1	1	0	1
LD2IV2_20	Restricted	Body	16	11	5	3
LD2IV2_20	Restricted	Shoulder	1	0	1	1
LD2IV2_20	Unrestricted	Body	5	3	2	1
LD2IV2_48	Restricted	Body	1	0	1	1
LD2IV2_48	Restricted	Rim/Neck	1	0	1	1
LD2IV2_48	NI	Body	1	1	0	0
LD2IV2_48	Unrestricted	Body	2	1	1	1
LD2IV2_54	Restricted	Body	86	45	41	17
LD2IV2_54	Restricted	Body incised	1	1	0	1
LD2IV2_54	Restricted	Body with appliqué	1	0	1	1
LD2IV2_54	Restricted	Neck	3	0	3	2
LD2IV2_54	Restricted	Neck incised	1	1	0	1
LD2IV2_54	Restricted	Rim/Neck	1	1	0	1
LD2IV2_54	Restricted	Rim/Neck w/incisions	1	0	1	1
LD2IV2_54	NI	NI	3	0	3	0
LD2IV2_54	NI	Rim	1	1	0	0
LD2IV2_54	Unrestricted	Base	1	0	1	1
LD2IV2_54	Unrestricted	Body	26	12	14	5
LD2IV2_54	Unrestricted	Body white slip	2	1	1	2
LD2IV2_54	Unrestricted	Rim	1	1	0	1
LD2IV2_54	Unrestricted	Rim/Neck	2	1	1	2
LD2IV4_52	Restricted	Body	124	53	71	25
LD2IV4_52	Restricted	Neck	2	0	2	2
LD2IV4_52	Restricted	Rim/Neck	3	1	2	3
LD2IV4_52	Restricted	Rim/Neck w/incisions	5	0	5	5
LD2IV4_52	Restricted	Shoulder	3	2	1	1
LD2IV4_52	Restricted	Shoulder incised	1	1	0	1
LD2IV4_52	NI	Base	1	1	0	1
LD2IV4_52	NI	Body	4	4	0	0
LD2IV4_52	NI	Rim	1	1	0	0
LD2IV4_52	Unrestricted	Base	6	1	5	5
LD2IV4_52	Unrestricted	Body	38	22	16	7
LD2IV4_52	Unrestricted	Body incised	1	1	0	1
LD2IV4_52	Unrestricted	Body white slip	2	1	1	2
LD2IV4_52	Unrestricted	Rim/Neck	6	3	3	6
LD2IV4_52	Unrestricted	Rim/Neck w/white slip	1	1	0	1
LD2IX4_66	Restricted	Base	1	1	0	1
LD2IX4_66	Restricted	Body	45	19	26	9
LD2IX4_66	Restricted	Neck	1	0	1	1
LD2IX4_66	Restricted	Neck incised	1	1	0	1
LD2IX4_66	Restricted	Rim/Neck	1	1	0	1
LD2IX4_66	Restricted	Shoulder incised	1	0	1	1
LD2IX4_66	Restricted	Shoulder/Neck	1	0	1	1
LD2IX4_66	NI	Body	1	1	0	0
LD2IX4_66	NI	Rim	1	1	0	1
LD2IX4_66	Unrestricted	Base	2	0	2	2
LD2IX4_66	Unrestricted	Body	22	11	11	6
LD2IX4_66	Unrestricted	Body incised	1	0	1	1
LD2IX4_66	Unrestricted	Body white slip	1	0	1	1
LD2IX4_66	Unrestricted	Rim/Neck	1	0	1	1
LD2IX4_88	Restricted	Body	5	0	5	5

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD2IX4_88	Unrestricted	Base	1	0	1	1
LD2IX4_88	Unrestricted	Body	2	2	0	2
LD2IX4_89	Restricted	Body	36	19	17	8
LD2IX4_89	Restricted	Neck incised	1	1	0	1
LD2IX4_89	Restricted	Rim/Neck	1	0	1	1
LD2IX4_89	Restricted	Rim/Neck w/white slip	2	0	2	2
LD2IX4_89	Restricted	Shoulder	3	1	2	2
LD2IX4_89	Restricted	Shoulder incised	1	0	1	1
LD2IX4_89	NI	Rim	1	1	0	0
LD2IX4_89	Unrestricted	Body	14	10	4	3
LD2VII2_75	Restricted	Appliqué	1	1	0	1
LD2VII2_75	Restricted	Body	239	156	83	48
LD2VII2_75	Restricted	Neck	9	7	2	3
LD2VII2_75	Restricted	Neck incised	2	2	0	2
LD2VII2_75	Restricted	NI	1	1	0	1
LD2VII2_75	Restricted	Rim/Neck	6	2	4	6
LD2VII2_75	Restricted	Rim/Neck w/incisions	5	1	4	5
LD2VII2_75	Restricted	Shoulder	5	4	1	3
LD2VII2_75	Restricted	Shoulder incised	1	0	1	1
LD2VII2_75	Restricted	Shoulder/Neck	1	1	0	1
LD2VII2_75	Restricted	Xúmitl	3	2	1	3
LD2VII2_75	Restricted	Xúmitl Rim/Neck	1	0	1	1
LD2VII2_75	NI	Appliqué	1	1	0	1
LD2VII2_75	NI	Base	2	0	2	2
LD2VII2_75	NI	Body	10	10	0	0
LD2VII2_75	NI	Rim	4	4	0	2
LD2VII2_75	NI	Rim w/incisions	1	1	0	1
LD2VII2_75	NI	Xúmitl	1	1	0	1
LD2VII2_75	Unrestricted	Base	11	5	6	7
LD2VII2_75	Unrestricted	Body	126	102	24	26
LD2VII2_75	Unrestricted	Body incised	2	2	0	2
LD2VII2_75	Unrestricted	Body white slip	3	3	0	3
LD2VII2_75	Unrestricted	Rim/Neck	8	5	3	8
LD2VII2_75	Unrestricted	Rim/Neck w/white slip	1	1	0	1
LD2VII2_75	Unrestricted	Xúmitl	1	1	0	1
LD2VIII3_59	Restricted	Rim/Neck w/incisions	1	0	1	1
LD2VIII3_60	Unrestricted	Body	1	0	1	1
LD2VIII3_61	Restricted	Base	1	0	1	1
LD2VIII3_62	Unrestricted	Base	1	0	1	1
LD2VIII3_63	Restricted	Body	1	0	1	1
LD2VIII3_64	Restricted	Body	1	0	1	1
LD2VIII4_70	Restricted	Body	87	53	34	8
LD2VIII4_70	Restricted	Body incised	2	1	1	1
LD2VIII4_70	Restricted	Body white slip	1	1	0	1
LD2VIII4_70	Restricted	Neck	2	2	0	1
LD2VIII4_70	Restricted	Neck incised	3	0	3	4
LD2VIII4_70	Restricted	Rim/Neck	2	0	2	2
LD2VIII4_70	Restricted	Rim/Neck w/incisions	2	0	2	2
LD2VIII4_70	Restricted	Shoulder	1	0	1	1
LD2VIII4_70	Restricted	Shoulder incised	4	0	4	4
LD2VIII4_70	NI	Body	5	4	1	0
LD2VIII4_70	NI	Body incised	1	0	1	1
LD2VIII4_70	NI	Support	1	1	0	1
LD2VIII4_70	Unrestricted	Base	4	3	1	4
LD2VIII4_70	Unrestricted	Body	30	19	11	7
LD2VIII4_70	Unrestricted	Body white slip	3	3	0	3
LD2VIII4_70	Unrestricted	Rim w/incisions	1	1	0	1
LD2VIII4_70	Unrestricted	Rim/Neck	2	1	1	2
LD2VIIIa3_136	NI	Body appliqué	1	0	1	1
LD2VIIIa3_87	Restricted	Body	37	19	18	8
LD2VIIIa3_87	Restricted	Neck	1	1	0	1
LD2VIIIa3_87	Unrestricted	Body	16	10	6	3
LD2VIIIa3_87	Unrestricted	Body White Slip Incised	1	0	1	1
LD2VIIIa3_87	Unrestricted	Rim/Neck	1	0	1	1
LD2VIIIa4_104	Restricted	Body	27	21	6	5
LD2VIIIa4_104	Restricted	Neck	2	2	0	1
LD2VIIIa4_104	Restricted	Rim/Neck	1	0	1	1
LD2VIIIa4_104	NI	Body	1	1	0	0

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD2VIIIa4_104	Unrestricted	Body	4	2	2	3
LD2VIIIa4_104	Unrestricted	Rim/Neck	1	1	0	1
LD2VIIIa4_104	Unrestricted	Xúmitl	1	1	0	1
LD2VIIIa4_68	Restricted	Base	1	0	1	1
LD2VIIIa4_68	Restricted	Body	67	27	40	14
LD2VIIIa4_68	Restricted	Body incised	1	0	1	1
LD2VIIIa4_68	Restricted	Body incised w/appliqué	1	0	1	1
LD2VIIIa4_68	Restricted	Neck incised	1	0	1	1
LD2VIIIa4_68	Restricted	Neck w/white slip	1	0	1	1
LD2VIIIa4_68	Restricted	Rim/Neck w/incisions	1	1	0	1
LD2VIIIa4_68	Restricted	Shoulder/Neck incised	1	0	1	1
LD2VIIIa4_68	Restricted	Xúmitl	1	0	1	1
LD2VIIIa4_68	NI	Appliqué	1	1	0	1
LD2VIIIa4_68	NI	Base	2	1	1	2
LD2VIIIa4_68	NI	Body	4	3	1	0
LD2VIIIa4_68	Unrestricted	Base	7	1	6	6
LD2VIIIa4_68	Unrestricted	Body	30	14	16	6
LD2VIIIa4_68	Unrestricted	Rim/Neck	1	0	1	1
LD2VIIIa4_73	Restricted	Body	66	25	41	13
LD2VIIIa4_73	Restricted	Rim/Neck	3	1	2	3
LD2VIIIa4_73	Restricted	Rim/Neck w/incisions	1	1	0	1
LD2VIIIa4_73	Restricted	Shoulder	1	0	1	1
LD2VIIIa4_73	Restricted	Shoulder incised	2	0	2	2
LD2VIIIa4_73	Restricted	Shoulder/Neck	1	0	1	1
LD2VIIIa4_73	NI	Body	9	8	1	0
LD2VIIIa4_73	NI	Xúmitl	1	0	1	1
LD2VIIIa4_73	Unrestricted	Base	4	1	3	4
LD2VIIIa4_73	Unrestricted	Body	39	16	23	8
LD2VIIIa4_73	Unrestricted	Body incised	2	2	0	2
LD2VIIIa4_73	Unrestricted	Body white slip	3	3	0	2
LD2VIIIa4_73	Unrestricted	Rim/Neck	4	2	2	4
LD2VIIIa4_92	Restricted	Body	7	1	6	3
LD2VIIIa4_92	NI	Body	2	1	1	0
LD2VIIIa4_92	Unrestricted	Base	1	0	1	1
LD2VIIIa4_92	Unrestricted	Body	3	2	1	3
LD2VIIIa4_92	Unrestricted	Rim/Neck	1	0	1	1
LD2VIIIa4_93	Restricted	Body	28	10	18	6
LD2VIIIa4_93	Restricted	Neck	1	0	1	1
LD2VIIIa4_93	Restricted	Rim/Neck	1	0	1	1
LD2VIIIa4_93	Restricted	Rim/Neck w/incisions	3	0	3	3
LD2VIIIa4_93	NI	Body	4	2	2	1
LD2VIIIa4_93	Unrestricted	Body	12	6	6	3
LD2VIIIa4_93	Unrestricted	Rim/Neck	1	0	1	1
LD2X3_81	Restricted	Base	1	0	1	1
LD2X3_81	Restricted	Body	77	52	25	15
LD2X3_81	Restricted	Body incised	2	1	1	2
LD2X3_81	Restricted	Neck incised	1	0	1	1
LD2X3_81	Restricted	Rim/Neck	3	1	2	3
LD2X3_81	Restricted	Rim/Neck w/incisions	3	1	2	3
LD2X3_81	Restricted	Shoulder	2	1	1	1
LD2X3_81	Restricted	Shoulder/Neck incised	1	0	1	1
LD2X3_81	NI	Body	5	4	1	0
LD2X3_81	NI	Rim	3	2	1	0
LD2X3_81	Unrestricted	Base	2	1	1	2
LD2X3_81	Unrestricted	Body	40	24	16	8
LD2X3_81	Unrestricted	Body incised	2	0	2	2
LD2X3_81	Unrestricted	Body white slip	1	1	0	1
LD2X3_81	Unrestricted	Rim/Neck	3	0	3	3
LD2X3_81	Unrestricted	Rim/Neck w/white slip	2	1	1	2
LD2X3_84	Restricted	Body	53	31	22	11
LD2X3_84	Restricted	Neck	3	1	2	2
LD2X3_84	Restricted	Rim/Neck	2	0	2	2
LD2X3_84	Restricted	Shoulder	3	1	2	2
LD2X3_84	NI	Rim	1	1	0	0
LD2X3_84	Unrestricted	Base	3	2	1	2
LD2X3_84	Unrestricted	Body	42	30	12	8
LD2X3_84	Unrestricted	Body white slip	3	1	2	3
LD2XII4_86	Restricted	Body	102	51	51	20

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD2XII4_86	Restricted	Neck	2	1	1	1
LD2XII4_86	Restricted	Neck incised	1	1	0	1
LD2XII4_86	Restricted	Rim/Neck	2	0	2	2
LD2XII4_86	Restricted	Rim/Neck w/incisions	2	0	2	2
LD2XII4_86	Restricted	Shoulder	2	1	1	1
LD2XII4_86	Restricted	Shoulder/Neck	1	1	0	1
LD2XII4_86	NI	Body	10	10	0	0
LD2XII4_86	NI	Body white slip	1	1	0	1
LD2XII4_86	NI	Rim	1	1	0	0
LD2XII4_86	Unrestricted	Base	3	0	3	3
LD2XII4_86	Unrestricted	Body	37	26	11	8
LD2XII4_86	Unrestricted	Body incised	1	0	1	1
LD2XII4_86	Unrestricted	Body white slip	3	3	0	3
LD2XII4_86	Unrestricted	Rim/Neck	2	2	0	2
LD2XII4_86	Unrestricted	Rim/Neck w/white slip	2	0	2	2
LD2XII4_94	Restricted	Body	256	187	69	50
LD2XII4_94	Restricted	Neck incised	1	0	1	1
LD2XII4_94	Restricted	Rim/Neck	10	6	4	10
LD2XII4_94	Restricted	Rim/Neck w/incisions	5	3	2	5
LD2XII4_94	Restricted	Shoulder	3	0	3	3
LD2XII4_94	Restricted	Shoulder incised	1	1	0	1
LD2XII4_94	Restricted	Xúmitl Shoulder	1	1	0	1
LD2XII4_94	NI	Base	3	1	2	1
LD2XII4_94	NI	Body	21	20	1	0
LD2XII4_94	NI	Rim	6	3	3	3
LD2XII4_94	NI	Rim w/incisions	2	2	0	2
LD2XII4_94	Unrestricted	Base	5	2	3	5
LD2XII4_94	Unrestricted	Body	119	95	24	22
LD2XII4_94	Unrestricted	Body incised	5	5	0	5
LD2XII4_94	Unrestricted	Body white slip	7	7	0	4
LD2XII4_94	Unrestricted	Body with appliqué	1	1	0	1
LD2XII4_94	Unrestricted	Rim/Neck	7	2	5	7
LD2XII4_94	Unrestricted	Xúmitl	2	2	0	2
LD2XII4_96	Restricted	Body	148	91	57	31
LD2XII4_96	Restricted	Neck	3	1	2	1
LD2XII4_96	Restricted	Neck incised	3	2	1	3
LD2XII4_96	Restricted	Rim/Neck	4	3	1	4
LD2XII4_96	Restricted	Rim/Neck w/incisions	3	0	3	3
LD2XII4_96	Restricted	Shoulder	5	2	3	1
LD2XII4_96	NI	Body	8	8	0	0
LD2XII4_96	NI	Body white slip	1	1	0	1
LD2XII4_96	NI	Rim	3	3	0	0
LD2XII4_96	Unrestricted	Base	2	1	1	2
LD2XII4_96	Unrestricted	Body	49	43	6	10
LD2XII4_96	Unrestricted	Body incised	4	4	0	3
LD2XII4_96	Unrestricted	Body white slip	1	1	0	1
LD2XII4_96	Unrestricted	Rim/Neck	4	0	4	4
LD2XII4_99	Malacate	NA	1	0	1	1
LD2XII5_102	Restricted	Body	75	39	36	15
LD2XII5_102	Restricted	Neck	1	1	0	1
LD2XII5_102	Restricted	Neck incised	4	2	2	4
LD2XII5_102	Restricted	Rim/Neck w/incisions	3	0	3	3
LD2XII5_102	Restricted	Shoulder	1	0	1	1
LD2XII5_102	Restricted	Shoulder incised	1	0	1	1
LD2XII5_102	Restricted	Xúmitl	1	1	0	1
LD2XII5_102	NI	Body	2	2	0	0
LD2XII5_102	NI	Rim	1	1	0	0
LD2XII5_102	Unrestricted	Base	1	0	1	1
LD2XII5_102	Unrestricted	Base w/white slip	1	0	1	1
LD2XII5_102	Unrestricted	Body	50	35	15	10
LD2XII5_102	Unrestricted	Body white slip	2	2	0	2
LD2XII5_102	Unrestricted	Rim/Neck	2	1	1	0
LD2XII5_102	Unrestricted	Rim/Neck w/white slip	1	1	0	1
LD2XII5_109	Restricted	Body	30	13	17	11
LD2XII5_109	Restricted	Body white slip	2	1	1	1
LD2XII5_109	Restricted	Neck	1	0	1	1
LD2XII5_109	Restricted	Rim/Neck w/incisions	1	0	1	1
LD2XII5_109	Restricted	Xúmitl	1	1	0	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD2XII5_109	Unrestricted	Body	13	6	7	5
LD2XII5_109	Unrestricted	Rim/Neck w/white slip	1	0	1	1
LD2XII5_111	Restricted	Base	1	0	1	1
LD2XII5_111	Restricted	Body	77	45	32	15
LD2XII5_111	Restricted	Body incised	1	0	1	1
LD2XII5_111	Restricted	Neck	5	3	2	1
LD2XII5_111	Restricted	Rim/Neck	4	1	3	4
LD2XII5_111	Restricted	Rim/Neck w/incisions	1	1	0	1
LD2XII5_111	NI	Body	6	6	0	0
LD2XII5_111	NI	Rim	1	1	0	0
LD2XII5_111	Unrestricted	Base	1	0	1	1
LD2XII5_111	Unrestricted	Body	39	25	14	8
LD2XII5_111	Unrestricted	Body white slip	2	2	0	2
LD2XII5_111	Unrestricted	Rim/Neck	2	0	2	2
LD2XII5_111	Unrestricted	Xúmitl	4	2	2	4
LD2XII5_113	Restricted	Body	1	0	1	1
LD2XII5_114	Unrestricted	Rim/Neck w/white slip	1	0	1	1
LD2XII5_115	Restricted	Body	39	16	23	13
LD2XII5_115	Restricted	Neck incised	1	0	1	1
LD2XII5_115	Restricted	Rim/Neck	3	1	2	3
LD2XII5_115	Restricted	Rim/Neck w/incisions	1	0	1	1
LD2XII5_115	Restricted	Shoulder	2	1	1	1
LD2XII5_115	NI	Body	1	1	0	0
LD2XII5_115	NI	Body white slip	1	1	0	1
LD2XII5_115	Unrestricted	Body	8	5	3	3
LD2XII5_115	Unrestricted	Rim/Neck	1	0	1	1
LD2XII5_116	Restricted	Neck incised	1	0	1	1
LD2XII5_117	Restricted	Rim/Neck incised white slip	1	0	1	1
LD2XII5_118	Restricted	Rim/Neck	1	0	1	1
LD2XII5_119	Unrestricted	Body	1	0	1	1
LD2XVI5_121	Restricted	Base	1	0	1	1
LD2XVI5_121	Restricted	Body	192	122	70	40
LD2XVI5_121	Restricted	Body incised	1	1	0	1
LD2XVI5_121	Restricted	Neck	3	3	0	2
LD2XVI5_121	Restricted	Neck incised	2	1	1	2
LD2XVI5_121	Restricted	Neck w/white slip	1	0	1	1
LD2XVI5_121	Restricted	Rim w/incisions	1	1	0	0
LD2XVI5_121	Restricted	Rim/Neck	6	3	3	6
LD2XVI5_121	Restricted	Rim/Neck w/incisions	3	2	1	3
LD2XVI5_121	Restricted	Shoulder	2	0	2	1
LD2XVI5_121	Restricted	Shoulder incised	1	0	1	1
LD2XVI5_121	NI	Base	1	0	1	0
LD2XVI5_121	NI	Body	8	8	0	0
LD2XVI5_121	NI	Rim	2	2	0	0
LD2XVI5_121	Unrestricted	Base	4	4	0	2
LD2XVI5_121	Unrestricted	Body	116	95	21	22
LD2XVI5_121	Unrestricted	Body incised	6	4	2	6
LD2XVI5_121	Unrestricted	Body white slip	8	7	1	3
LD2XVI5_121	Unrestricted	Body with appliqué	1	0	1	0
LD2XVI5_121	Unrestricted	Rim/Neck	5	1	4	5
LD2XVI6_124	Restricted	Body	6	1	5	3
LD2XVI6_124	Restricted	Rim/Neck w/appliqué	1	0	1	1
LD2XVI6_124	NI	Body	2	1	1	1
LD2XVI6_124	Unrestricted	Body	6	3	3	3
LD2XVI6_124	Unrestricted	Body incised	1	0	1	1
LD2XVI6_127	Restricted	Body	81	36	45	26
LD2XVI6_127	Restricted	Body incised	5	2	3	5
LD2XVI6_127	Restricted	Body white slip	1	1	0	1
LD2XVI6_127	Restricted	Rim	2	1	1	2
LD2XVI6_127	Restricted	Rim/Neck	2	0	2	2
LD2XVI6_127	Restricted	Shoulder	5	2	3	5
LD2XVI6_127	NI	Body	10	10	0	0
LD2XVI6_127	NI	Handle	1	1	0	1
LD2XVI6_127	NI	Rim	2	2	0	0
LD2XVI6_127	NI	Rim/Neck	3	1	2	3
LD2XVI6_127	NI	Xúmitl	2	2	0	2
LD2XVI6_127	Unrestricted	Body	51	32	19	16
LD2XVI6_127	Unrestricted	Body incised	2	0	2	2

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LD2XVI6_127	Unrestricted	Body white slip	4	2	2	3
LD2XVI6_127	Unrestricted	Rim/Neck	3	1	2	3
LD2XVI6_127	Unrestricted	Rim/Neck w/incisions	1	0	1	1
LD2XVI6_131	NI	Handle	1	0	1	1
LD2XVIII7_132	Restricted	Body	24	11	13	8
LD2XVIII7_132	Restricted	Neck	1	0	1	1
LD2XVIII7_132	Restricted	Neck incised	1	0	1	1
LD2XVIII7_132	Restricted	Shoulder	1	0	1	1
LD2XVIII7_132	Restricted	Shoulder/Neck	1	0	1	1
LD2XVIII7_132	NI	Body	2	2	0	0
LD2XVIII7_132	Unrestricted	Body	7	4	3	7
LD2XVIII7_132	Unrestricted	Rim/Neck	1	0	1	1
LD2XVIII7_137	Restricted	Body	1	1	0	1
LD2XVIII7_137	Restricted	Neck	1	0	1	1
LD2XVIII7_137	NI	Rim	1	0	1	1
LPT3DP_1319	Restricted	Body	14	6	8	14
LPT3DP_1319	Restricted	Rim/Neck	1	1	0	1
LPT3DP_1319	NI	Body acanalado	1	1	0	1
LPT3DP_1319	Unrestricted	Rim/Neck	1	1	0	1
LPT3F4_250	Restricted	Complete Vessel	1	0	1	1
LPT3F46_348	Restricted	Body	2	2	0	2
LPT3F46_348	Unrestricted	Body	1	0	1	1
LPT3I2_48	Bead	NA	1	1	0	1
LPT3I2_48	Restricted	Body	28	17	11	9
LPT3I2_48	Restricted	Rim/Neck	1	0	1	1
LPT3I2_48	Restricted	Shoulder incised	1	0	1	1
LPT3I2_48	NI	Base	1	0	1	1
LPT3I2_48	Unrestricted	Base	2	2	0	2
LPT3I2_48	Unrestricted	Body	8	6	2	3
LPT3I2_48	Unrestricted	Body white slip	2	2	0	2
LPT3I2_48	Unrestricted	Rim	1	1	0	1
LPT3I2_48	Unrestricted	Rim w/white slip	1	1	0	1
LPT3I3_92	Restricted	Body	100	60	40	33
LPT3I3_92	Restricted	Body incised	1	0	1	1
LPT3I3_92	Restricted	Neck	1	0	1	1
LPT3I3_92	Restricted	Neck incised	1	0	1	1
LPT3I3_92	Restricted	Rim/Neck	1	0	1	1
LPT3I3_92	Restricted	Rim/Neck w/incisions	3	1	2	3
LPT3I3_92	Restricted	Shoulder	6	4	2	2
LPT3I3_92	Restricted	Shoulder incised	2	0	2	2
LPT3I3_92	NI	Base	4	2	2	2
LPT3I3_92	NI	Body	4	4	0	0
LPT3I3_92	NI	Body white slip	1	1	0	0
LPT3I3_92	NI	Rim	1	1	0	0
LPT3I3_92	Unrestricted	Base	7	3	4	6
LPT3I3_92	Unrestricted	Base w/white slip	1	0	1	1
LPT3I3_92	Unrestricted	Body	29	20	9	9
LPT3I3_92	Unrestricted	Body incised	1	1	0	1
LPT3I3_92	Unrestricted	Body white slip	6	1	5	6
LPT3I3_92	Unrestricted	Rim/Neck	2	2	0	2
LPT3I3_92	Unrestricted	Rim/Neck w/incisions	2	0	2	2
LPT3I3_92	Unrestricted	Rim/Neck w/white slip	2	2	0	2
LPT3I4_212	Restricted	Base	3	2	1	3
LPT3I4_212	Restricted	Body	158	83	75	50
LPT3I4_212	Restricted	Body incised	2	2	0	2
LPT3I4_212	Restricted	Neck incised	4	1	3	4
LPT3I4_212	Restricted	Neck incised & punctuated	1	1	0	1
LPT3I4_212	Restricted	Rim/Neck	8	4	4	8
LPT3I4_212	Restricted	Rim/Neck w/incisions	3	0	3	3
LPT3I4_212	Restricted	Shoulder	2	1	1	2
LPT3I4_212	Restricted	Shoulder incised	2	0	2	2
LPT3I4_212	Restricted	Shoulder/Neck incised	2	0	2	2
LPT3I4_212	NI	Body	12	12	0	0
LPT3I4_212	NI	Rim	4	4	0	0
LPT3I4_212	NI	Rim/Neck w/white slip	3	1	2	3
LPT3I4_212	Unrestricted	Base	6	4	2	6
LPT3I4_212	Unrestricted	Body	76	52	24	25
LPT3I4_212	Unrestricted	Body excavated	1	1	0	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LPT3I4_212	Unrestricted	Body incised	2	1	1	2
LPT3I4_212	Unrestricted	Body white slip	9	6	3	5
LPT3I4_212	Unrestricted	Rim/Neck	5	0	5	5
LPT3II4_184	Bead	NA	1	0	1	1
LPT3II4_184	Restricted	Base	8	2	6	7
LPT3II4_184	Restricted	Body	190	107	83	60
LPT3II4_184	Restricted	Body incised	4	4	0	2
LPT3II4_184	Restricted	Neck	6	1	5	5
LPT3II4_184	Restricted	Neck incised	4	2	2	2
LPT3II4_184	Restricted	Rim/Neck	9	4	5	9
LPT3II4_184	Restricted	Rim/Neck w/incisions	3	2	1	3
LPT3II4_184	Restricted	Shoulder	3	1	2	2
LPT3II4_184	Restricted	Shoulder/Neck incised	2	1	1	2
LPT3II4_184	Restricted	Xúmitl	1	1	0	1
LPT3II4_184	NI	Base	1	0	1	1
LPT3II4_184	NI	Body	2	2	0	0
LPT3II4_184	NI	Body incised	3	2	1	1
LPT3II4_184	NI	Body white slip	1	1	0	0
LPT3II4_184	NI	Rim	2	1	1	1
LPT3II4_184	Unrestricted	Base	3	0	3	3
LPT3II4_184	Unrestricted	Base w/white slip	1	0	1	1
LPT3II4_184	Unrestricted	Body	78	64	14	25
LPT3II4_184	Unrestricted	Body incised	3	3	0	1
LPT3II4_184	Unrestricted	Body white slip	17	9	8	11
LPT3II4_184	Unrestricted	Rim/Neck	7	4	3	7
LPT3II4_184	Unrestricted	Rim/Neck w/white slip	8	4	4	8
LPT3II5_310	Restricted	Base	3	2	1	3
LPT3II5_310	Restricted	Body	124	87	37	40
LPT3II5_310	Restricted	Neck	5	2	3	3
LPT3II5_310	Restricted	Rim/Neck	4	2	2	4
LPT3II5_310	Restricted	Shoulder	5	3	2	5
LPT3II5_310	Restricted	Shoulder/Neck	2	1	1	2
LPT3II5_310	NI	Body	8	8	0	0
LPT3II5_310	NI	Rim/Neck	1	0	1	1
LPT3II5_310	Unrestricted	Base	12	9	3	12
LPT3II5_310	Unrestricted	Body	112	93	19	14
LPT3II5_310	Unrestricted	Body incised	2	1	1	2
LPT3II5_310	Unrestricted	Rim/Neck	5	4	1	5
LPT3II5_310(2)	Restricted	Base	1	0	1	1
LPT3II5_310(2)	Restricted	Body	17	7	10	7
LPT3II5_310(2)	Restricted	Body incised	3	2	1	3
LPT3II5_310(2)	Restricted	Neck incised	1	1	0	1
LPT3II5_310(2)	Restricted	Rim/Neck	6	1	5	6
LPT3II5_310(2)	Restricted	Shoulder incised	1	0	1	1
LPT3II5_310(2)	Restricted	Shoulder/Neck incised	1	0	1	1
LPT3II5_310(2)	NI	Body	2	1	1	1
LPT3II5_310(2)	Unrestricted	Base	1	0	1	1
LPT3II5_310(2)	Unrestricted	Body	12	8	4	4
LPT3II5_310(2)	Unrestricted	Body incised	6	5	1	6
LPT3II5_310(2)	Unrestricted	Body white slip	5	5	0	5
LPT3II5_310(2)	Unrestricted	Rim/Neck	3	0	3	3
LPT3II5_310(2)	Unrestricted	Rim/Neck w/white slip	2	2	0	2
LPT3II5_312	Clay ball	NA	1	1	0	1
LPT3II5_312	Restricted	Body	53	26	27	17
LPT3II5_312	Restricted	Body incised	4	1	3	4
LPT3II5_312	Restricted	Rim/Neck	4	1	3	4
LPT3II5_312	Restricted	Shoulder	2	1	1	2
LPT3II5_312	Restricted	Shoulder incised	1	0	1	1
LPT3II5_312	NI	Base	1	0	1	1
LPT3II5_312	NI	Body	4	4	0	0
LPT3II5_312	NI	Rim	2	0	2	2
LPT3II5_312	Unrestricted	Base	2	0	2	2
LPT3II5_312	Unrestricted	Body	39	29	10	13
LPT3II5_312	Unrestricted	Body incised	3	1	2	3
LPT3II5_312	Unrestricted	Body white slip	1	1	0	1
LPT3II5_312	Unrestricted	Rim/Neck	5	3	2	5
LPT3II5-6_356	Restricted	Body	4	3	1	1
LPT3II5-6_356	Restricted	Body incised punctuated	1	1	0	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LPT3II5-6_356	Restricted	Shoulder incised	1	0	1	1
LPT3II5-6_356	NI	Body	3	3	0	0
LPT3II5-6_356	NI	Rim/Neck w/white slip	2	1	1	2
LPT3II5-6_356	Unrestricted	Body	3	2	1	1
LPT3II5-6_356	Unrestricted	Body incised	1	0	1	1
LPT3II5-6_356	Unrestricted	Body white slip	2	0	2	2
LPT3III6_402	Restricted	Body	28	17	11	11
LPT3III6_402	Restricted	Body incised	2	1	1	2
LPT3III6_402	Restricted	Neck	1	0	1	1
LPT3III6_402	Restricted	Rim/Neck	5	3	2	5
LPT3III6_402	Restricted	Shoulder appliqué	1	1	0	1
LPT3III6_402	Malacate	NA	1	0	1	1
LPT3III6_402	NI	Base	2	1	1	1
LPT3III6_402	NI	Body	11	11	0	0
LPT3III6_402	NI	Body white slip	1	1	0	1
LPT3III6_402	Unrestricted	Base	2	0	2	2
LPT3III6_402	Unrestricted	Body	32	22	10	11
LPT3III6_402	Unrestricted	Body incised	3	2	1	3
LPT3III6_402	Unrestricted	Body white slip	1	1	0	1
LPT3III6_402	Unrestricted	Rim	1	1	0	0
LPT3III6_402	Unrestricted	Rim/Neck	5	4	1	5
LPT3III7_372	Restricted	Body	16	7	9	5
LPT3III7_372	Restricted	Body excavated	1	0	1	1
LPT3III7_372	Restricted	Neck	1	0	1	1
LPT3III7_372	Restricted	Rim/Neck	4	1	3	4
LPT3III7_372	Restricted	Shoulder	1	1	0	1
LPT3III7_372	Restricted	Shoulder/Neck	1	0	1	1
LPT3III7_372	NI	Base	1	1	0	1
LPT3III7_372	NI	Body	13	12	1	2
LPT3III7_372	NI	Rim	1	1	0	0
LPT3III7_372	Unrestricted	Base	3	1	2	3
LPT3III7_372	Unrestricted	Body	19	6	13	6
LPT3III7_372	Unrestricted	Rim/Neck	3	2	1	3
LPT3III8_390	NI	Body	2	1	1	2
LPT3III8_390	Unrestricted	Base	1	1	0	1
LPT3III8_390	Unrestricted	Body	5	1	4	5
LV1I2_3	Restricted	Body	19	11	8	7
LV1I2_3	Restricted	Rim/Neck	1	0	1	1
LV1I2_3	Restricted	Shoulder/Neck	6	3	3	3
LV1I2_3	NI	Body	6	6	0	0
LV1I2_3	NI	Rim	4	4	0	0
LV1I2_3	Unrestricted	Body	75	65	10	25
LV1I2_3	Unrestricted	Body incised	4	3	1	2
LV1I2_3	Unrestricted	Body white slip	1	1	0	1
LV1I2_3	Unrestricted	Body with appliqué	1	0	1	1
LV1I2_3	Unrestricted	Rim	4	3	1	2
LV1I2_3	Unrestricted	Rim/Neck	7	4	3	7
LV1II2_10	Restricted	Body	76	36	40	25
LV1II2_10	Restricted	Body incised	1	0	1	1
LV1II2_10	Restricted	Rim	3	3	0	2
LV1II2_10	Restricted	Rim/Neck	5	1	4	3
LV1II2_10	Restricted	Shoulder	11	6	5	5
LV1II2_10	Restricted	Shoulder incised	1	1	0	1
LV1II2_10	NI	Body	4	3	1	0
LV1II2_10	NI	Rim	7	6	1	0
LV1II2_10	Unrestricted	Base	8	3	5	6
LV1II2_10	Unrestricted	Body	327	306	21	100
LV1II2_10	Unrestricted	Body acanalado	1	1	0	1
LV1II2_10	Unrestricted	Body appliqué	1	1	0	0
LV1II2_10	Unrestricted	Body incised	9	5	4	5
LV1II2_10	Unrestricted	Body punctuated	1	0	1	1
LV1II2_10	Unrestricted	Rim	12	9	3	4
LV1II2_10	Unrestricted	Rim/Neck	22	10	12	16
LV1II2_10	Tool	NA	1	0	1	1
LV1II2_11	Restricted	Base	1	1	0	1
LV1II2_11	Restricted	Body	91	69	22	30
LV1II2_11	Restricted	Neck	3	3	0	2
LV1II2_11	Restricted	Rim Excavated	1	1	0	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LV1II2_11	Restricted	Rim/Neck	3	1	2	3
LV1II2_11	Restricted	Shoulder	4	3	1	3
LV1II2_11	Restricted	Shoulder/Neck	2	1	1	2
LV1II2_11	NI	Body	6	4	2	0
LV1II2_11	NI	Neck	3	3	0	1
LV1II2_11	NI	Rim	3	1	2	0
LV1II2_11	NI	Rim/Neck	3	1	2	2
LV1II2_11	NI	Support	2	2	0	1
LV1II2_11	Unrestricted	Base	2	2	0	1
LV1II2_11	Unrestricted	Body	165	127	38	55
LV1II2_11	Unrestricted	Body incised	1	1	0	1
LV1II2_11	Unrestricted	Rim	11	8	3	3
LV1II2_11	Unrestricted	Rim/Neck	10	3	7	9
LV1II2_11	Tool	NA	1	1	0	1
LV1II2_17	Restricted	Body	61	48	13	20
LV1II2_17	Restricted	Rim/Neck	2	2	0	2
LV1II2_17	Restricted	Shoulder	1	0	1	1
LV1II2_17	Restricted	Shoulder white slip	1	0	1	1
LV1II2_17	NI	Base	1	1	0	1
LV1II2_17	NI	Body	11	9	2	2
LV1II2_17	NI	Body appliqué	1	0	1	1
LV1II2_17	NI	Rim	6	5	1	0
LV1II2_17	NI	Rim/Neck	2	2	0	2
LV1II2_17	NI	Support	1	0	1	1
LV1II2_17	Unrestricted	Body	87	70	17	24
LV1II2_17	Unrestricted	Body incised	4	3	1	2
LV1II2_17	Unrestricted	Body white slip	1	0	1	1
LV1II2_17	Unrestricted	Rim	1	0	1	1
LV1II2_17	Unrestricted	Rim/Neck	6	3	3	5
LV1III2_19	Restricted	Body	15	8	7	6
LV1III2_19	Restricted	Shoulder	1	0	1	1
LV1III2_19	NI	Body	1	1	0	0
LV1III2_19	NI	NI	2	2	0	0
LV1III2_19	Unrestricted	Base	2	2	0	1
LV1III2_19	Unrestricted	Body	23	18	5	8
LV1III2_19	Unrestricted	Body incised	1	0	1	1
LV1III2_19	Unrestricted	Body white slip	1	1	0	1
LV1III2_19	Unrestricted	Rim	2	2	0	0
LV1III2_19	Unrestricted	Rim/Neck	4	3	1	4
LV1III3_28	Restricted	Body	30	13	17	11
LV1III3_28	Restricted	Body incised	1	1	0	0
LV1III3_28	Restricted	Body with appliqué	1	0	1	1
LV1III3_28	Restricted	Rim/Neck	4	1	3	3
LV1III3_28	Restricted	Shoulder	6	1	5	5
LV1III3_28	NI	Body	4	4	0	0
LV1III3_28	NI	Lug	1	1	0	1
LV1III3_28	NI	Rim/Neck	3	1	2	2
LV1III3_28	NI	Shoulder	3	3	0	1
LV1III3_28	NI	Support	1	1	0	1
LV1III3_28	Unrestricted	Base	6	4	2	4
LV1III3_28	Unrestricted	Body	130	84	46	46
LV1III3_28	Unrestricted	Body acanalado	1	1	0	1
LV1III3_28	Unrestricted	Body incised	5	3	2	4
LV1III3_28	Unrestricted	Body with appliqué	1	1	0	0
LV1III3_28	Unrestricted	Rim	2	2	0	1
LV1III3_28	Unrestricted	Rim/Neck	20	10	10	15
LV1III3_28	Tool	NA	1	0	1	1
LV1III3_29	Restricted	Body	39	25	14	14
LV1III3_29	Restricted	Shoulder	5	4	1	3
LV1III3_29	NI	Body	3	2	1	0
LV1III3_29	NI	Rim	1	1	0	0
LV1III3_29	Unrestricted	Base	6	4	2	6
LV1III3_29	Unrestricted	Body	127	111	16	45
LV1III3_29	Unrestricted	Body excavated	1	0	1	1
LV1III3_29	Unrestricted	Body incised	4	3	1	4
LV1III3_29	Unrestricted	Rim	5	4	1	3
LV1III3_29	Unrestricted	Rim/Neck	4	2	2	4
LV1VI3_42	Restricted	Base	2	1	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LV1VI3_42	Restricted	Body	45	29	16	16
LV1VI3_42	Restricted	Rim w/white slip	1	0	1	1
LV1VI3_42	Restricted	Rim/Neck	4	0	4	4
LV1VI3_42	Restricted	Shoulder	10	4	6	6
LV1VI3_42	NI	Handle	1	0	1	1
LV1VI3_42	NI	Shoulder	1	1	0	1
LV1VI3_42	NI	Support	1	1	0	1
LV1VI3_42	Unrestricted	Base	9	4	5	5
LV1VI3_42	Unrestricted	Body	188	150	38	58
LV1VI3_42	Unrestricted	Body excavated	1	1	0	1
LV1VI3_42	Unrestricted	Body incised	2	2	0	2
LV1VI3_42	Unrestricted	Body white slip	1	0	1	1
LV1VI3_42	Unrestricted	Body with appliqué	1	1	0	1
LV1VI3_42	Unrestricted	Rim	7	6	1	3
LV1VI3_42	Unrestricted	Rim w/white slip	1	0	1	1
LV1VI3_42	Unrestricted	Rim/Neck	22	12	10	20
LV1VI3_42	Unrestricted	Shoulder	1	1	0	0
LV1VI3_42	Tool	NA	1	0	1	2
LV1VI3_43	NI	Appliqué	1	0	1	1
LV1VI4_54	Restricted	Body	3	1	2	2
LV1VI4_54	NI	Body	1	1	0	0
LV1VI4_54	Unrestricted	Body	7	3	4	4
LV1VI4_54	Unrestricted	Rim	2	2	0	2
LV1VI4_54	Unrestricted	Rim/Neck	2	1	1	2
LV1VI5_47	Restricted	Rim/Neck	1	0	1	1
LV1VI5_47	NI	Lug	1	0	1	1
LV1VI5_47	Unrestricted	Body	9	6	3	3
LV1VI5_47	Unrestricted	Body white slip	1	0	1	1
LV1VI5_47	Unrestricted	Rim/Neck	2	1	1	2
LV1VI6_48	Restricted	Body	1	0	1	1
LV1VI6_48	Unrestricted	Body	1	1	0	1
LV1VI6_48	Unrestricted	Rim/Neck	1	0	1	1
LV2II2_14	Restricted	Body	3	2	1	2
LV2II2_14	NI	Body	5	1	4	3
LV2II2_14	NI	Rim	1	1	0	0
LV2II2_14	Unrestricted	Body	3	2	1	2
LV2II2_14	Unrestricted	Body incised	1	0	1	1
LV2IV3_24	Restricted	Body	2	2	0	0
LV2IV3_24	NI	Body	1	1	0	0
LV2IV3_24	NI	Rim	1	0	1	1
LV2IV3_24	NI	Shoulder/Neck	13	6	7	4
LV2IV3_24	Unrestricted	Body	4	3	1	1
LV2V4_36	Restricted	Body	71	40	31	20
LV2V4_36	Restricted	Rim	1	0	1	1
LV2V4_36	Restricted	Rim/Neck	11	5	6	10
LV2V4_36	Restricted	Shoulder	6	3	3	2
LV2V4_36	NI	Body	2	2	0	0
LV2V4_36	NI	NI	1	1	0	1
LV2V4_36	NI	Rim/Neck	1	0	1	1
LV2V4_36	Unrestricted	Base	7	4	3	4
LV2V4_36	Unrestricted	Body	101	71	30	30
LV2V4_36	Unrestricted	Body with appliqué	1	1	0	0
LV2V4_36	Unrestricted	Rim	4	1	3	1
LV2V4_36	Unrestricted	Rim w/incisions	3	1	2	3
LV2V4_36	Unrestricted	Rim/Neck w/appliqué	1	1	0	1
LV2V4_36	Unrestricted	Shoulder/Neck	4	1	3	1
LV2VI5_39	Restricted	Body	15	8	7	7
LV2VI5_39	Restricted	Shoulder	2	2	0	0
LV2VI5_39	NI	Rim	2	2	0	1
LV2VI5_39	Unrestricted	Base	2	1	1	2
LV2VI5_39	Unrestricted	Body	39	27	12	13
LV2VI5_39	Unrestricted	Lug	1	0	1	0
LV2VI5_39	Unrestricted	Rim/Neck	3	1	2	3
LVA1I1_3	Restricted	Neck	1	0	1	1
LVA1I1_3	NI	Body	1	1	0	1
LVA2II2_9	NI	Body	1	0	1	1
LVA2S?_7	NI	Base	1	0	1	1
LVA3I1_10	Restricted	Body	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
LVA3I1_12	NI	Body	1	0	1	1
LVA4II2_24	Unrestricted	Rim/Neck	1	0	1	1
LVA4II3_26	NI	Body	3	1	2	3
OP1A??_148	Restricted	Body	2	1	1	0
OP1A??_148	Unrestricted	Body	1	0	1	0
OP1A?4-6_114	NI	Body	1	0	1	0
OP1A?4-6_114	Unrestricted	Body	5	3	2	0
OP1AH3	Restricted	Body	3	2	1	0
OP1AH3	Unrestricted	Body	1	1	0	0
OP1AII/III4_80	Restricted	Body	1	0	1	1
OP1AII/III4_80	NI	Body	2	1	1	1
OP1AII/III4_80	Unrestricted	Body	3	2	1	1
OP1AII/III4_80	Unrestricted	Rim/Neck	1	1	0	1
OP1AII3_198	Restricted	Body	2	1	1	0
OP1AII3_198	Unrestricted	Body	1	1	0	0
OP1AII4_15	Restricted	Body	1	0	1	1
OP1AII4_18	Restricted	Base	1	1	0	1
OP1AII4_18	Restricted	Body	2	1	1	2
OP1AII4_19	Restricted	Body	1	0	1	1
OP1AII4_20	Restricted	Body	1	0	1	1
OP1AII4_21	Restricted	Body	5	2	3	2
OP1AII4_21	NI	Body	1	0	1	0
OP1AII4_3	Restricted	Body	6	4	2	2
OP1AII4_3	Restricted	Body white slip	1	0	1	1
OP1AII4_3	Restricted	Shoulder	1	1	0	1
OP1AII4_3	Unrestricted	Body	2	0	2	1
OP1AII4_31	Restricted	Body	19	5	14	4
OP1AII4_31	NI	Body	5	1	4	1
OP1AII4_31	Unrestricted	Body	5	3	2	2
OP1AII4_4	Restricted	Body	1	0	1	1
OP1AII4_4	Restricted	Body incised	1	1	0	1
OP1AII4_40	Restricted	Body	10	6	4	3
OP1AII4_40	Restricted	Body incised	1	0	1	1
OP1AII4_40	Restricted	Rim/Neck	2	1	1	2
OP1AII4_40	NI	Body	3	1	2	1
OP1AII4_40	NI	Rim	1	0	1	0
OP1AII4_40	NI	Support	1	0	1	1
OP1AII4_40	Unrestricted	Body	1	0	1	1
OP1AII4_43	Restricted	Body	2	1	1	2
OP1AII4_45	Unrestricted	Body	1	0	1	1
OP1AII4_46	Restricted	Body	1	0	1	1
OP1AII4_6	Restricted	Body	1	0	1	1
OP1AII4-5_197	Restricted	Body	8	6	2	2
OP1AII4-5_197	NI	Body	1	1	0	0
OP1AII4-5_197	Unrestricted	Body	1	1	0	0
OP1AIIA4_62	Restricted	Body	22	12	10	10
OP1AIIA4_62	Restricted	Rim	1	0	1	1
OP1AIIA4_62	Restricted	Rim/Neck w/incisions	1	0	1	1
OP1AIIA4_62	Restricted	Shoulder	2	0	2	2
OP1AIIA4_62	NI	Body	3	3	0	0
OP1AIIA4_62	NI	Rim	2	2	0	2
OP1AIIA4_62	Unrestricted	Body	6	5	1	2
OP1AIIB4-5_65	Restricted	Body	1	0	1	0
OP1AIIB4-5_65	Restricted	Rim/Neck	1	0	1	1
OP1AIIB4-5_65	Unrestricted	Body	2	2	0	0
OP1AIII4_10	Unrestricted	Rim/Neck	1	0	1	1
OP1AIII4_11	Restricted	Body	1	0	1	1
OP1AIII4_113	Restricted	Body	1	1	0	1
OP1AIII4_113	Unrestricted	Body	1	0	1	1
OP1AIII4_13	Restricted	Body	11	8	3	3
OP1AIII4_13	Unrestricted	Body	2	1	1	1
OP1AIII4_26	Unrestricted	Body	1	0	1	1
OP1AIII4_27	Restricted	Body	5	2	3	3
OP1AIII4_27	Restricted	Rim/Neck	1	0	1	1
OP1AIII4_27	Unrestricted	Body	2	1	1	1
OP1AIII4_32	Restricted	Base	1	0	1	1
OP1AIII4_32	Restricted	Body	7	6	1	2
OP1AIII4_32	Restricted	Rim/Neck	2	1	1	2

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
OP1AIII4_32	NI	Body	7	7	0	1
OP1AIII4_32	NI	Body white slip	1	1	0	1
OP1AIII4_32	Unrestricted	Body	13	6	7	5
OP1AIII4_32	Unrestricted	Rim	1	1	0	1
OP1AIII4_36	Unrestricted	Body	1	0	1	1
OP1AIII4_37	Restricted	Body	1	0	1	1
OP1AIII4_38	Restricted	Body	1	0	1	1
OP1AIII4_48	Restricted	Body	1	0	1	1
OP1AIII4_8	Restricted	Body	1	0	1	1
OP1AIII5_52	Restricted	Body	3	0	3	3
OP1AIII5_52	Restricted	Body incised	1	0	1	1
OP1AIII5_52	NI	Body	2	0	2	2
OP1AIII5_52	Unrestricted	Body	1	0	1	1
OP1AIII5_52	Unrestricted	Body incised	1	1	0	1
OP1AIII5_54	Restricted	Body	15	8	7	5
OP1AIII5_54	NI	Body	5	5	0	2
OP1AIII5_54	Unrestricted	Body	7	5	2	3
OP1AIII5_56	Restricted	Body	1	0	1	1
OP1AIII5_57	Unrestricted	Body incised	1	0	1	1
OP1AIII5_61	NI	Handle	1	0	1	1
OP1AIIIA4-5_66	Restricted	Body	18	9	9	6
OP1AIIIA4-5_66	NI	Base	1	0	1	1
OP1AIIIA4-5_66	NI	Body	1	1	0	1
OP1AIIIA4-5_66	NI	Rim/Neck	1	0	1	1
OP1AIIIA4-5_66	Unrestricted	Body	3	2	1	2
OP1AVII5_72	Restricted	Body	1	0	1	1
OP1AVII5_72	NI	Body	1	1	0	1
OP1AVII5_72	Unrestricted	Body	1	0	1	1
OP1AVII5_74	Restricted	Body	1	0	1	1
OP1AVII5_77	Unrestricted	Body	2	1	1	2
OP1AVII5_77	Unrestricted	Body incised	1	0	1	1
OP1AVII5_78	Restricted	Base	1	0	1	1
OP1AVII5_85	Restricted	Base	1	0	1	1
OP1AVII5_85	Restricted	Body	22	9	13	7
OP1AVII5_85	Restricted	Body incised w/appliqué	1	1	0	1
OP1AVII5_85	Restricted	Neck	2	1	1	2
OP1AVII5_85	Restricted	Rim/Neck	2	1	1	2
OP1AVII5_85	NI	Body	15	11	4	6
OP1AVII5_85	Unrestricted	Body	18	11	7	6
OP1AVII5_85	Unrestricted	Body incised w/appliqué	1	0	1	1
OP1AVII5_85	Unrestricted	Rim/Neck	2	0	2	2
OP1AVII7_110	Restricted	Body	1	0	1	1
OP1AVII7_110	Unrestricted	Body	1	1	0	1
OP1AVIIM5_169	Restricted	Body	20	9	11	7
OP1AVIIM5_169	Restricted	Neck	2	1	1	1
OP1AVIIM5_169	Restricted	Rim/Neck	4	0	4	4
OP1AVIIM5_169	NI	Body	12	8	4	4
OP1AVIIM5_169	Unrestricted	Body	8	5	3	4
OP1AVIIM5_169	Unrestricted	Rim	1	0	1	1
OP1AVIIM5_169	Unrestricted	Rim/Neck	1	0	1	1
OP1AX5_93	NI	Body	2	2	0	2
OP1AX5_93	Unrestricted	Body	1	0	1	1
OP1AX5_93	Unrestricted	Body with appliqué	1	0	1	1
OP1AX5_97	Clay ball	NI	1	0	1	1
OP1AX5_98	NI	Body	4	2	2	1
OP1AX5_98	Unrestricted	Body	2	1	1	1
OP1AX5_98	Unrestricted	Body with appliqué	1	0	1	1
OP1AX5-8_199	Restricted	Body	1	1	0	0
OP1AX5-8_199	Unrestricted	Body	1	0	1	0
OP1AX6_102	Restricted	Body	9	6	3	3
OP1AX6_102	NI	Body	6	5	1	1
OP1AX6_102	Unrestricted	Base	3	2	1	3
OP1AX6_102	Unrestricted	Body	16	7	9	5
OP1AX6_102	Unrestricted	Body incised	3	1	2	3
OP1AX6_106	Restricted	Body	1	0	1	1
OP1AX6_106	NI	Body	2	0	2	2
OP1AX6_106	Unrestricted	Body	3	2	1	3
OP1BH2_119	Restricted	Body	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
OP1BH2_119	NI	Body	5	5	0	0
OP1BH2_119	Unrestricted	Body	5	5	0	0
OP1BHB2_120	NI	Body	2	1	1	0
OP1BVIIM5_166	Restricted	Body	1	0	1	1
OP1BVIIM5_167	NI	Body	1	0	1	1
OP1BVIIM5_172	Restricted	Body	1	0	1	1
OP1BXII2_122	Restricted	Body	10	5	5	4
OP1BXII2_122	Restricted	Shoulder	3	1	2	3
OP1BXII2_122	NI	Body	17	16	1	0
OP1BXII2_122	Unrestricted	Body	13	7	6	4
OP1BXII3_132	Restricted	Body	11	6	5	5
OP1BXII3_132	Restricted	Body incised	1	1	0	1
OP1BXII3_132	NI	Body	5	2	3	0
OP1BXII3_132	Unrestricted	Body	4	2	2	2
OP1BXII3_132	Unrestricted	Rim/Neck	1	0	1	1
OP1BXII3_139	Restricted	Body	4	2	2	2
OP1BXII3_139	Restricted	Rim/Neck	2	0	2	2
OP1BXII3_139	NI	Body	1	1	0	0
OP1BXII3_139	NI	Body incised	1	0	1	1
OP1BXII3_139	Unrestricted	Body	4	3	1	2
OP1BXII3_140	Restricted	Body	1	0	1	1
OP1BXII3_146	Restricted	Body	1	1	0	1
OP1BXII3_146	Unrestricted	Body	3	2	1	1
OP1BXII3_147	Bead	NI	1	1	0	1
OP1BXIIB2_127	Restricted	Body	2	1	1	1
OP1BXIIB2_127	Restricted	Rim/Neck	1	0	1	1
OP1BXIIB2_127	Unrestricted	Body	2	1	1	1
OP1BXIIC2_126	Restricted	Body	3	2	1	1
OP1BXIX4_152	Restricted	Body	28	16	12	8
OP1BXIX4_152	Restricted	Body incised	2	1	1	2
OP1BXIX4_152	Restricted	Neck	1	0	1	1
OP1BXIX4_152	Restricted	Rim/Neck	1	0	1	1
OP1BXIX4_152	NI	Body	2	1	1	0
OP1BXIX4_152	Unrestricted	Body	9	9	0	3
OP1BXIX4_152	Unrestricted	Rim/Neck	3	2	1	3
OP1BXM6_190	Restricted	Body	2	1	1	2
OP1BXM6_190	NI	Body	2	2	0	0
OP1BXM6_190	NI	Rim/Neck	1	0	1	1
OP1BXM6_190	Unrestricted	Body	6	3	3	4
OP1BXM6_195	Clay ball	NI	1	0	1	1
OP1BXV3_134	Restricted	Body	3	1	2	3
OP1BXV3_134	Unrestricted	Body	1	1	0	1
OP1BXX4_157	Restricted	Body	3	1	2	3
OP1BXX4_157	Unrestricted	Body	1	1	0	1
OP1BXX4_159	Restricted	Body	7	2	5	7
OP1BXX4_159	Unrestricted	Body	1	1	0	1
OP1BXX4_159	Unrestricted	Body incised	6	6	0	6
OP1BXX4_163	NI	Body	1	0	1	1
OP1BXXI5_176	Restricted	Body	9	3	6	6
OP1BXXI5_176	NI	Body	3	2	1	2
OP1BXXI5_176	Unrestricted	Body	7	6	1	4
OP1BXXI5_176	Unrestricted	Rim/Neck	1	0	1	1
OP1BXXI5_176	Unrestricted	Shoulder incised w/appliqué	1	1	0	1
OP1BXXI5_184	Restricted	Body	5	2	3	3
OP1BXXI5_184	NI	Body	6	6	0	2
OP1BXXI5_184	Unrestricted	Body	3	3	0	1
OP1BXXIA5_185	Restricted	Body	3	2	1	2
OP1BXXIA5_185	NI	Body	2	1	1	1
OP1BXXIA5_185	Unrestricted	Body	3	2	1	3
OP1BXXIA5_185	Unrestricted	Rim	1	1	0	1
OP2??_74	NI	Body	1	1	0	0
OP2??_74	Unrestricted	Support	1	0	1	1
OP2H1_3	Restricted	Body	1	0	1	0
OP2I1_6	Restricted	Body	2	1	1	0
OP2I1_6	Unrestricted	Body	1	1	0	0
OP2I1_8	Restricted	Body	11	8	3	3
OP2I1_8	Restricted	Body incised	1	1	0	1
OP2I1_8	Restricted	Neck	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
OP2I1_8	Restricted	Rim	1	1	0	1
OP2I1_8	NI	Base	1	0	1	1
OP2I1_8	NI	Body	6	6	0	0
OP2I1_8	NI	Rim	1	0	1	1
OP2I1_8	Unrestricted	Body	3	1	2	2
OP2IA2_39	NI	Body	1	0	1	0
OP2IA2_39	Unrestricted	Body	1	1	0	0
OP2IC2_19	Restricted	Body	1	0	1	1
OP2IC2_19	Unrestricted	Body	2	1	1	2
OP2IE2_21	Restricted	Body	4	1	3	2
OP2IE2_21	Restricted	Neck incised	1	0	1	1
OP2IE2_21	NI	Body	2	2	0	0
OP2IE2_21	Unrestricted	Base	1	1	0	1
OP2IE2_21	Unrestricted	Body	1	0	1	1
OP2IE2_21	Unrestricted	Rim	1	1	0	1
OP2IE2_21	Unrestricted	Rim/Neck	1	0	1	1
OP2IF2_42	Restricted	Body	2	0	2	2
OP2IF2_42	Unrestricted	Body	2	2	0	2
OP2IF2_63	Restricted	NI	1	0	1	0
OP2IH/K1_61	NI	Body	1	0	1	0
OP2IX2_52	Restricted	Body	1	0	1	1
OP2IX3_50	Unrestricted	Body	1	0	1	1
OP2IX3_57	Unrestricted	Rim/Neck	1	0	1	1
OP2IX3_58	Unrestricted	Body	1	0	1	1
OP2IX3_60	Restricted	Body	2	1	1	1
OP2IX3_60	Restricted	Neck	1	0	1	1
OP2IX3_60	NI	Body	3	2	1	0
OP2IX3_60	Unrestricted	Body	4	1	3	3
OP2IX3_66	Restricted	Body	13	9	4	4
OP2IX3_66	Restricted	Rim/Neck	2	0	2	2
OP2IX3_66	NI	Body	4	4	0	0
OP2IX3_66	NI	Rim	1	1	0	1
OP2IX3_66	Unrestricted	Base	2	1	1	2
OP2IX3_66	Unrestricted	Body	11	6	5	3
OP2IX3_66	Unrestricted	Body incised	2	1	1	2
OP2IX3_66	Unrestricted	Support	1	0	1	1
OP2SIH/K2_41	Restricted	Neck	1	0	1	0
OP2SIH/K2_41	Restricted	Shoulder/Neck	2	1	1	0
OP2SIH/K2_41	NI	Body	2	2	0	0
OP2SIH/K2_43	Unrestricted	Body	1	0	1	1
OP2V?_28	Restricted	Body	4	1	3	1
OP2V?_28	NI	Body	3	3	0	0
OP2V?_28	Unrestricted	Base w/appliqué, incised, punctuated	0	0	0	0
OP2V?_28	Unrestricted	Body	7	2	5	3
OP2V1_10	Unrestricted	Body	1	0	1	1
OP2V1_11	Unrestricted	Body incised	1	0	1	1
OP2V1_12	Restricted	Body	1	0	1	1
OP2V1_13	Restricted	Body	1	0	1	0
OP2V1_14	Unrestricted	Body	1	0	1	1
OP2V1_16	Restricted	Body	58	24	34	19
OP2V1_16	Restricted	Body incised	1	1	0	1
OP2V1_16	Restricted	Body incised w/appliqué	1	1	0	1
OP2V1_16	Restricted	Neck	4	2	2	4
OP2V1_16	Restricted	Rim/Neck	6	2	4	6
OP2V1_16	NI	Body	29	27	2	0
OP2V1_16	NI	Rim	5	1	4	5
OP2V1_16	Unrestricted	Body	55	45	10	15
OP2V1_16	Unrestricted	Body incised	4	1	3	4
OP2V1_16	Unrestricted	Rim/Neck	2	0	2	2
OP2V1_24	Restricted	Body	28	17	11	9
OP2V1_24	Restricted	Body appliqué punctuated	1	0	1	1
OP2V1_24	Restricted	Body incised	3	2	1	3
OP2V1_24	Restricted	Neck	1	0	1	1
OP2V1_24	Restricted	Rim/Neck	1	0	1	1
OP2V1_24	Restricted	Shoulder	1	0	1	1
OP2V1_24	Restricted	Shoulder incised	1	0	1	1
OP2V1_24	NI	Handle	1	0	1	1
OP2V1_24	NI	NI	3	0	3	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
OP2V1_24	NI	Rim	1	0	1	1
OP2V1_24	Unrestricted	Body	14	8	6	5
OP2V1_24	Unrestricted	Body incised	2	0	2	2
OP2V1_24	Unrestricted	Rim/Neck	1	0	1	1
OP2V2_25	Restricted	Body	16	1	15	5
OP2V2_25	Restricted	Body incised	2	1	1	2
OP2V2_25	Restricted	Body punctuated	1	0	1	1
OP2V2_25	Restricted	Body with appliqué	1	1	0	1
OP2V2_25	Restricted	Rim/Neck	2	0	2	2
OP2V2_25	NI	Body	18	12	6	3
OP2V2_25	Unrestricted	Base	1	0	1	1
OP2V2_25	Unrestricted	Body	22	14	8	7
OP2V2_25	Unrestricted	Rim/Neck	3	1	2	3
OP2VI1_29	Restricted	Shoulder	1	0	1	1
OP2VI2_31	Restricted	Base	3	0	3	3
OP2VI2_31	Restricted	Body	5	4	1	1
OP2VI2_31	Restricted	Rim/Neck w/appliqué	1	0	1	1
OP2VI2_31	NI	Body	2	1	1	1
OP2VI2_31	Unrestricted	Body	6	3	3	2
OP2VI2_34	NI	Teja?	1	0	1	1
OP2VIII2_44	Restricted	Body	1	0	1	1
OP2VIII2_45	Restricted	Body incised	1	0	1	1
OP2VIII2_46	Unrestricted	Rim/Neck	1	0	1	1
OP2VIII2_47	Restricted	Base	1	0	1	1
OP2VIII2_47	Restricted	Body	37	21	16	13
OP2VIII2_47	Restricted	Rim/Neck	3	1	2	3
OP2VIII2_47	Restricted	Shoulder	5	0	5	5
OP2VIII2_47	Restricted	Shoulder/Neck	1	0	1	1
OP2VIII2_47	NI	Body	13	12	1	1
OP2VIII2_47	Unrestricted	Base	4	1	3	4
OP2VIII2_47	Unrestricted	Body	44	23	21	15
OP2VIII2_47	Unrestricted	Body incised	4	3	1	4
OP2VIII2_47	Unrestricted	Rim	1	1	0	1
OP2VIII2_47	Unrestricted	Rim/Neck	1	0	1	1
OP2VIII2_51	Restricted	Body	6	3	3	2
OP2VIII2_51	Restricted	Shoulder white slip	1	0	1	1
OP2VIII2_51	NI	Body	2	0	2	0
OP2VIII2_51	Unrestricted	Body	8	5	3	2
OP2VIII2_51	Unrestricted	Body white slip	1	1	0	1
OP2VIII2_54	NI	Body	1	0	1	1
OP2VIII2_55	Unrestricted	Body	1	0	1	1
OP2XI3_70	Restricted	Body	1	0	1	1
OP2XI3_70	NI	Body	2	0	2	0
OP2XI3_70	Unrestricted	Body	2	2	0	2
OPIB2_40	NI	Body	1	0	1	0
QP1I4_?	NI	Body	13	8	5	13
QP1Ia4_3	NI	Base	1	0	1	0
QP1Ia4_3	NI	Body	2	1	1	0
QP1IB5_40	Restricted	Body	0	0	0	0
QP1V4_10	Unrestricted	Body	1	0	1	1
QP1V4_11	Restricted	Body	2	1	1	2
QP1V4_11	NI	Body	7	3	4	7
QP1V4_11	Unrestricted	Body	2	2	0	2
QP1V4_15	NI	Body	1	0	1	1
QP1V4_15	Unrestricted	Body	1	0	1	1
QP1V4_17	Unrestricted	Body	1	0	1	1
QP1V4_20	Restricted	Body	1	0	1	1
QP1V4_24	Restricted	Neck	1	0	1	1
QP1V4_29	Unrestricted	Rim/Neck	1	0	1	1
QP1V4_30	Restricted	Base	1	0	1	1
QP1V4_30	Restricted	Body	5	2	3	5
QP1V4_30	NI	Body	4	3	1	4
QP1V4_30	Unrestricted	Body	7	1	6	7
QP1V4_33	Unrestricted	Body	1	0	1	1
QP1V4_35	NI	Body	1	0	1	1
QP1V4_36	Unrestricted	Body	1	0	1	1
QP1V4_6	NI	Body	2	0	2	2
QP1V4_6	Unrestricted	Body	1	1	0	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
QP1V5_43	Restricted	Body	2	0	2	2
QP1V5_43	NI	Body	2	2	0	2
QP1V5_43	Unrestricted	Body	2	1	1	2
QP3AII-4_4	Unrestricted	Body	1	0	1	1
QP3BVI-5_11	Restricted	Body	1	0	1	1
RAI1I2_22	Restricted	Body	11	10	1	3
RAI1I2_22	Restricted	NI	1	1	0	0
RAI1I2_22	Restricted	Shoulder/Neck	1	0	1	1
RAI1I2_22	NI	Base	1	0	1	1
RAI1I2_22	Unrestricted	Base	1	1	0	1
RAI1I2_22	Unrestricted	Body	5	4	1	1
RAI1I2_22	Unrestricted	Body white slip	1	1	0	1
RAI1I2_3	Restricted	Body	11	6	5	3
RAI1I2_3	NI	Rim	1	1	0	1
RAI1I2_3	Unrestricted	Body	2	1	1	1
RAI1I2_3	Unrestricted	Rim	1	1	0	1
RAI1I2_3	Unrestricted	Rim/Neck	1	0	1	1
RAI1I2_7	Unrestricted	Base	1	0	1	1
RAI1I3_10	NI	Body	1	0	1	1
RAI1I3_11	Restricted	Body	62	42	20	21
RAI1I3_11	Restricted	Neck	1	0	1	1
RAI1I3_11	Restricted	Rim	1	1	0	1
RAI1I3_11	Restricted	Shoulder	2	0	2	2
RAI1I3_11	Restricted	Support	1	0	1	1
RAI1I3_11	NI	Body	4	4	0	1
RAI1I3_11	NI	Lug	1	1	0	1
RAI1I3_11	Unrestricted	Base	2	0	2	2
RAI1I3_11	Unrestricted	Body	43	28	15	14
RAI1I3_11	Unrestricted	Body incised	3	2	1	3
RAI1I3_8	Restricted	Body	56	26	30	20
RAI1I3_8	Restricted	Rim/Neck	1	0	1	1
RAI1I3_8	Restricted	Shoulder	3	1	2	1
RAI1I3_8	Restricted	Shoulder incised	1	0	1	1
RAI1I3_8	Unrestricted	Base	3	1	2	2
RAI1I3_8	Unrestricted	Body	32	18	14	12
RAI1I3_8	Unrestricted	Body incised	2	1	1	2
RAI1I3_8	Unrestricted	Rim/Neck	2	0	2	2
RAI1II3_14	Restricted	Body	38	21	17	13
RAI1II3_14	Restricted	Neck incised	2	0	2	2
RAI1II3_14	Restricted	Rim/Neck	1	1	0	1
RAI1II3_14	Restricted	Shoulder	2	0	2	1
RAI1II3_14	NI	Body	2	2	0	0
RAI1II3_14	Unrestricted	Body	26	13	13	9
RAI1II3_14	Unrestricted	Body incised	1	1	0	1
RAI1II3_14	Unrestricted	Body white slip	1	1	0	1
RAI1II3_14	Unrestricted	Rim/Neck	3	2	1	3
RAI1II3_19	Restricted	Body	121	86	35	40
RAI1II3_19	Restricted	Neck	6	3	3	3
RAI1II3_19	Restricted	Rim/Neck	2	1	1	2
RAI1II3_19	Restricted	Rim/Neck w/white slip	1	0	1	1
RAI1II3_19	Restricted	Shoulder	9	3	6	6
RAI1II3_19	Restricted	Shoulder incised	3	1	2	3
RAI1II3_19	Restricted	Shoulder/Neck	1	1	0	1
RAI1II3_19	NI	Body	8	8	0	0
RAI1II3_19	NI	Body incised	2	2	0	2
RAI1II3_19	Unrestricted	Base	6	1	5	5
RAI1II3_19	Unrestricted	Body	104	69	35	35
RAI1II3_19	Unrestricted	Body incised	5	3	2	5
RAI1II3_19	Unrestricted	Body white slip	3	3	0	3
RAI1II3_19	Unrestricted	Rim/Neck	2	1	1	2
RAI1II3_19	Unrestricted	Rim/Neck w/incisions	3	1	2	3
RAI1II3_19	Unrestricted	Xúmitl	1	1	0	1
RAI1II3_24	Restricted	Body	55	34	21	15
RAI1II3_24	Restricted	Neck incised	1	1	0	1
RAI1II3_24	Restricted	Rim/Neck	5	2	3	5
RAI1II3_24	Restricted	Shoulder	1	0	1	0
RAI1II3_24	Restricted	Shoulder incised	1	0	1	1
RAI1II3_24	NI	Support white slip	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
RAI1II3_24	Unrestricted	Base	1	0	1	1
RAI1II3_24	Unrestricted	Base w/white slip	1	1	0	1
RAI1II3_24	Unrestricted	Body	57	45	12	15
RAI1II3_24	Unrestricted	Body incised	1	1	0	1
RAI1II3_24	Unrestricted	Body white slip	2	2	0	1
RAI1II3_24	Unrestricted	Rim/Neck	1	1	0	1
RAI1II3_24	Unrestricted	Rim/Neck w/white slip	1	1	0	1
RAI1II3_26	Restricted	Rim/Neck w/incisions	1	0	1	1
RAI1II3_27	Restricted	Body	115	70	45	35
RAI1II3_27	Restricted	Neck	1	0	1	1
RAI1II3_27	Restricted	Neck incised	1	0	1	1
RAI1II3_27	Restricted	Rim	1	0	1	1
RAI1II3_27	Restricted	Rim/Neck w/incisions	1	1	0	1
RAI1II3_27	Restricted	Shoulder	1	1	0	0
RAI1II3_27	Restricted	Shoulder appliqué	1	0	1	1
RAI1II3_27	Restricted	Shoulder incised	1	0	1	1
RAI1II3_27	Restricted	Support	1	0	1	1
RAI1II3_27	NI	Body white slip	1	1	0	1
RAI1II3_27	NI	Lug	1	0	1	1
RAI1II3_27	NI	Rim	1	0	1	1
RAI1II3_27	NI	Rim/Neck w/incisions	1	0	1	1
RAI1II3_27	Unrestricted	Base	7	2	5	6
RAI1II3_27	Unrestricted	Base w/white slip	1	1	0	1
RAI1II3_27	Unrestricted	Body	81	62	19	20
RAI1II3_27	Unrestricted	Body white slip	1	0	1	1
RAI1II3_27	Unrestricted	Rim/Neck	2	1	1	2
RAI1II3_27	Unrestricted	Rim/Neck w/white slip	1	0	1	1
RAI1II3_27	Unrestricted	Xúmitl	3	3	0	3
RAI1IIa3_30	Restricted	Body	99	41	58	30
RAI1IIa3_30	Restricted	Body incised	1	1	0	1
RAI1IIa3_30	Restricted	Neck	2	0	2	1
RAI1IIa3_30	Restricted	Neck incised	2	1	1	2
RAI1IIa3_30	Restricted	Rim	2	0	2	2
RAI1IIa3_30	Restricted	Rim/Neck	5	1	4	5
RAI1IIa3_30	Restricted	Rim/Neck w/incisions	3	0	3	3
RAI1IIa3_30	Restricted	Shoulder	5	0	5	3
RAI1IIa3_30	Restricted	Shoulder incised	2	1	1	2
RAI1IIa3_30	NI	Body	95	94	1	0
RAI1IIa3_30	NI	Rim	1	1	0	0
RAI1IIa3_30	Unrestricted	Base	7	5	2	6
RAI1IIa3_30	Unrestricted	Base w/white slip	1	0	1	1
RAI1IIa3_30	Unrestricted	Body	77	60	17	20
RAI1IIa3_30	Unrestricted	Body incised	1	0	1	1
RAI1IIa3_30	Unrestricted	Body white slip	1	1	0	1
RAI1IIa3_30	Unrestricted	Rim/Neck	3	0	3	3
RAI1IIa3_30	Unrestricted	Xúmitl	1	1	0	1
RAI1IIa4_34	Restricted	Body	15	11	4	5
RAI1IIa4_34	Restricted	Neck	1	1	0	1
RAI1IIa4_34	Restricted	Neck incised	1	0	1	1
RAI1IIa4_34	Restricted	Shoulder incised	2	0	2	2
RAI1IIa4_34	Unrestricted	Body	17	13	4	5
RAI1IIa4_34	Unrestricted	Rim/Neck w/white slip	1	1	0	1
RAI1IIa4_38	Restricted	Body	41	34	7	13
RAI1IIa4_38	Restricted	Body incised	1	0	1	1
RAI1IIa4_38	Restricted	Neck	2	2	0	1
RAI1IIa4_38	Restricted	Rim/Neck	1	0	1	1
RAI1IIa4_38	NI	Body	6	5	1	1
RAI1IIa4_38	NI	Body incised	1	1	0	1
RAI1IIa4_38	Unrestricted	Base	1	1	0	1
RAI1IIa4_38	Unrestricted	Body	26	18	8	8
RAI1IIa4_38	Unrestricted	Body white slip	3	1	2	3
RAI1IIa4_38	Unrestricted	Rim/Neck	1	1	0	1
RAI1IIa4_74	Restricted	Body	19	8	11	6
RAI1IIa4_74	Restricted	Body incised	1	1	0	1
RAI1IIa4_74	Restricted	Neck incised	1	0	1	1
RAI1IIa4_74	Restricted	Rim/Neck	1	0	1	1
RAI1IIa4_74	Restricted	Rim/Neck w/incisions	2	1	1	2
RAI1IIa4_74	NI	Body	3	3	0	0

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
RAI1IIa4_74	NI	Body white slip	1	1	0	1
RAI1IIa4_74	Unrestricted	Base	2	1	1	2
RAI1IIa4_74	Unrestricted	Body	29	19	10	8
RAI1IIa4_74	Unrestricted	Body incised	1	0	1	1
RAI1IIa4_74	Unrestricted	Body white slip	2	1	1	2
RAI1III3_28	Restricted	Body	86	60	26	25
RAI1III3_28	Restricted	Rim w/incisions	1	1	0	1
RAI1III3_28	Restricted	Rim/Neck	6	1	5	6
RAI1III3_28	Restricted	Rim/Neck w/incisions	1	0	1	1
RAI1III3_28	Restricted	Rim/Neck w/white slip	1	0	1	1
RAI1III3_28	Restricted	Shoulder	4	2	2	3
RAI1III3_28	Restricted	Shoulder incised	1	0	1	1
RAI1III3_28	Restricted	Shoulder/Neck incised	2	0	2	2
RAI1III3_28	NI	Base	2	1	1	2
RAI1III3_28	NI	Body	3	3	0	0
RAI1III3_28	NI	Rim	1	1	0	0
RAI1III3_28	NI	Support white slip	2	1	1	2
RAI1III3_28	Unrestricted	Base	4	2	2	3
RAI1III3_28	Unrestricted	Body	85	55	30	25
RAI1III3_28	Unrestricted	Body incised	2	2	0	2
RAI1III3_28	Unrestricted	Rim/Neck	2	1	1	2
RAI1III3_28	Unrestricted	Xúmitl	1	1	0	1
RAI1III4_40	Restricted	Body	47	35	12	15
RAI1III4_40	Restricted	Body white slip	3	2	1	2
RAI1III4_40	Restricted	Neck incised	1	0	1	1
RAI1III4_40	Restricted	Shoulder	1	0	1	1
RAI1III4_40	Restricted	Shoulder white slip	1	1	0	1
RAI1III4_40	Restricted	Shoulder/Neck	2	0	2	2
RAI1III4_40	NI	Base	2	2	0	1
RAI1III4_40	NI	Body	2	2	0	0
RAI1III4_40	Unrestricted	Base	3	1	2	3
RAI1III4_40	Unrestricted	Base w/white slip	2	1	1	2
RAI1III4_40	Unrestricted	Body	76	57	19	25
RAI1III4_40	Unrestricted	Body incised	4	3	1	4
RAI1III4_40	Unrestricted	Rim/Neck	1	0	1	1
RAI1III4_40	Unrestricted	Xúmitl	1	1	0	1
RAI1III4_52	Restricted	Body	36	27	9	10
RAI1III4_52	Restricted	Body incised	1	1	0	1
RAI1III4_52	Restricted	Neck	1	0	1	1
RAI1III4_52	Restricted	Rim/Neck w/incisions	1	0	1	1
RAI1III4_52	Restricted	Shoulder	1	0	1	1
RAI1III4_52	NI	Body	3	3	0	0
RAI1III4_52	Unrestricted	Base	4	2	2	2
RAI1III4_52	Unrestricted	Body	37	27	10	10
RAI1III4_52	Unrestricted	Body white slip	2	2	0	2
RAI1III4_52	Unrestricted	Rim/Neck	1	0	1	1
RAI1III4_64	Restricted	Body	20	11	9	6
RAI1III4_64	NI	Body	3	3	0	0
RAI1III4_64	NI	Rim	2	2	0	0
RAI1III4_64	Unrestricted	Body	14	11	3	4
RAI1III4_64	Unrestricted	Body white slip	1	1	0	1
RAI1III4_64	Unrestricted	Rim/Neck	1	1	0	1
RAI1III5_116	Restricted	Body	3	2	1	3
RAI1III5_116	Unrestricted	Body	2	2	0	2
RAI1III5_33	Restricted	Body	24	16	8	8
RAI1III5_33	Restricted	Body incised	1	0	1	1
RAI1III5_33	Restricted	Neck	1	0	1	1
RAI1III5_33	Unrestricted	Base	2	0	2	2
RAI1III5_33	Unrestricted	Body	22	14	8	7
RAI1III5_33	Unrestricted	Body white slip	1	1	0	1
RAI1III5_33	Unrestricted	Rim/Neck	1	1	0	1
RAI1III5_70	Restricted	Shoulder	1	0	1	1
RAI1III5_70	Restricted	Shoulder incised	1	1	0	1
RAI1III5_70	NI	Body	1	1	0	1
RAI1III5_70	Unrestricted	Body	3	2	1	3
RAI1III8_137	Restricted	Body	1	0	1	1
RAI1IV4_121	Restricted	Body	25	18	7	8
RAI1IV4_121	Restricted	Body incised	2	2	0	2

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
RAI1IV4_121	Restricted	Neck	4	2	2	2
RAI1IV4_121	Restricted	Neck incised	1	0	1	1
RAI1IV4_121	Restricted	Rim w/incisions	1	0	1	1
RAI1IV4_121	Restricted	Rim/Neck	1	1	0	1
RAI1IV4_121	Restricted	Shoulder incised	1	0	1	1
RAI1IV4_121	NI	Body	3	3	0	0
RAI1IV4_121	Unrestricted	Body	14	9	5	4
RAI1IV4_121	Unrestricted	Body white slip	2	2	0	2
RAI1IV4_121	Unrestricted	Rim	1	0	1	1
RAI1IV4_121	Unrestricted	Rim/Neck w/white slip	1	0	1	1
RAI1IV4_46	Unrestricted	Body	1	0	1	1
RAI1IV4_47	Unrestricted	Body	1	0	1	1
RAI1IV4_55	Restricted	Body	157	109	48	50
RAI1IV4_55	Restricted	Neck	2	1	1	1
RAI1IV4_55	Restricted	Neck incised	5	3	2	5
RAI1IV4_55	Restricted	Rim/Neck	6	6	0	6
RAI1IV4_55	Restricted	Rim/Neck incised punctuated	1	0	1	1
RAI1IV4_55	Restricted	Shoulder	2	0	2	1
RAI1IV4_55	Restricted	Shoulder incised	1	1	0	1
RAI1IV4_55	Restricted	Xúmitl	1	1	0	1
RAI1IV4_55	NI	Base	1	1	0	1
RAI1IV4_55	NI	Body	7	7	0	1
RAI1IV4_55	NI	Body incised	2	1	1	2
RAI1IV4_55	NI	Lug	1	0	1	1
RAI1IV4_55	NI	Rim	4	2	2	2
RAI1IV4_55	NI	Rim w/white slip	1	1	0	1
RAI1IV4_55	Unrestricted	Base	3	1	2	3
RAI1IV4_55	Unrestricted	Base w/white slip	2	2	0	2
RAI1IV4_55	Unrestricted	Body	99	78	21	33
RAI1IV4_55	Unrestricted	Body incised	2	1	1	2
RAI1IV4_55	Unrestricted	Body white slip	7	5	2	5
RAI1IV4_55	Unrestricted	Rim/Neck	4	1	3	4
RAI1IV4_55	Unrestricted	Xúmitl	1	1	0	1
RAI1IV4_58	Restricted	Body	1	0	1	1
RAI1IV4_59	Restricted	Body	69	38	31	22
RAI1IV4_59	Restricted	Neck	2	1	1	1
RAI1IV4_59	Restricted	Neck incised	1	1	0	1
RAI1IV4_59	Restricted	Rim/Neck	2	0	2	2
RAI1IV4_59	Restricted	Rim/Neck w/incisions	1	0	1	1
RAI1IV4_59	Restricted	Shoulder	2	1	1	1
RAI1IV4_59	NI	Base	1	1	0	1
RAI1IV4_59	NI	Body	3	2	1	0
RAI1IV4_59	NI	Body white slip	1	1	0	1
RAI1IV4_59	NI	Rim	2	2	0	0
RAI1IV4_59	Unrestricted	Base	8	8	0	4
RAI1IV4_59	Unrestricted	Base w/white slip	1	0	1	1
RAI1IV4_59	Unrestricted	Body	69	49	20	21
RAI1IV4_59	Unrestricted	Body incised	2	1	1	2
RAI1IV4_59	Unrestricted	Body white slip	5	5	0	5
RAI1IV4_59	Unrestricted	Rim/Neck	1	0	1	1
RAI1IV5_77	Restricted	Body	106	27	79	31
RAI1IV5_77	Restricted	Body incised	1	0	1	1
RAI1IV5_77	Restricted	Body white slip	3	2	1	3
RAI1IV5_77	Restricted	Neck	5	1	4	4
RAI1IV5_77	Restricted	Neck incised	7	3	4	7
RAI1IV5_77	Restricted	Rim	1	1	0	1
RAI1IV5_77	Restricted	Rim/Neck w/incisions	2	0	2	2
RAI1IV5_77	Restricted	Shoulder	4	0	4	4
RAI1IV5_77	Restricted	Shoulder incised	1	0	1	1
RAI1IV5_77	Restricted	Shoulder/Neck	1	0	1	1
RAI1IV5_77	Restricted	Xúmitl	1	0	1	1
RAI1IV5_77	NI	Body	124	112	12	1
RAI1IV5_77	NI	Body incised	3	2	1	3
RAI1IV5_77	NI	Rim	4	3	1	0
RAI1IV5_77	Unrestricted	Base	2	1	1	2
RAI1IV5_77	Unrestricted	Body	133	38	95	45
RAI1IV5_77	Unrestricted	Body incised	5	1	4	5
RAI1IV5_77	Unrestricted	Body white slip	8	3	5	8

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
RAI1IV5_77	Unrestricted	Rim/Neck	3	1	2	3
RAI1IV5_77	Unrestricted	Rim/Neck w/white slip	3	1	2	3
RAI1IV5_77	Unrestricted	Xúmitl	3	2	1	3
RAI1IVa5_106	Restricted	Body	49	34	15	15
RAI1IVa5_106	Restricted	Neck incised	1	1	0	1
RAI1IVa5_106	Restricted	Shoulder	2	1	1	1
RAI1IVa5_106	Restricted	Shoulder incised	1	0	1	1
RAI1IVa5_106	NI	Body	1	1	0	0
RAI1IVa5_106	Unrestricted	Base	1	1	0	1
RAI1IVa5_106	Unrestricted	Body	27	20	7	9
RAI1IVa5_106	Unrestricted	Body incised	1	1	0	1
RAI1IVa5_106	Unrestricted	Body white slip	3	3	0	2
RAI1IVa5_106	Unrestricted	Rim/Neck	1	0	1	1
RAI1IVa5_106	Unrestricted	Rim/Neck w/incisions	1	1	0	1
RAI1IVa5_111	Restricted	Body	23	15	8	7
RAI1IVa5_111	Restricted	Body white slip	1	1	0	1
RAI1IVa5_111	Restricted	Neck incised	1	1	0	1
RAI1IVa5_111	Restricted	Rim/Neck	3	1	2	3
RAI1IVa5_111	Restricted	Shoulder	1	0	1	1
RAI1IVa5_111	Restricted	Shoulder incised	1	0	1	1
RAI1IVa5_111	Restricted	Xúmitl Shoulder	1	0	1	1
RAI1IVa5_111	NI	Body	5	5	0	0
RAI1IVa5_111	NI	Body incised	1	1	0	1
RAI1IVa5_111	NI	Rim	1	1	0	1
RAI1IVa5_111	Unrestricted	Base	3	2	1	3
RAI1IVa5_111	Unrestricted	Base w/white slip	1	0	1	1
RAI1IVa5_111	Unrestricted	Body	28	19	9	8
RAI1IVa5_111	Unrestricted	Body white slip	1	1	0	1
RAI1IVa5_111	Unrestricted	Rim/Neck w/white slip	1	1	0	1
RAI1IVa6_126	Restricted	Body	5	4	1	5
RAI1IVa6_126	NI	Body	1	0	1	1
RAI1IVa6_126	Unrestricted	Body	1	1	0	1
RAI1IVa6_126	Unrestricted	Body white slip	1	0	1	1
RAI1IX7_131	Restricted	Body	3	2	1	0
RAI1IX7_138	Restricted	Body	1	1	0	1
RAI1V4_119	Restricted	Body	31	24	7	10
RAI1V4_119	Restricted	Body incised	1	1	0	1
RAI1V4_119	Restricted	Neck	5	4	1	3
RAI1V4_119	Restricted	Rim/Neck	1	0	1	1
RAI1V4_119	Restricted	Rim/Neck w/incisions	2	1	1	2
RAI1V4_119	NI	Body	7	6	1	0
RAI1V4_119	Unrestricted	Base	4	2	2	2
RAI1V4_119	Unrestricted	Body	44	34	10	12
RAI1V4_119	Unrestricted	Body incised	1	1	0	1
RAI1V4_119	Unrestricted	Body white slip	2	2	0	2
RAI1V4_119	Unrestricted	Rim/Neck	1	1	0	1
RAI1V4_90	Restricted	Base	4	1	3	4
RAI1V4_90	Restricted	Body	23	14	9	7
RAI1V4_90	Restricted	Neck incised	1	0	1	1
RAI1V4_90	Restricted	Shoulder	1	1	0	1
RAI1V4_90	NI	Body incised	1	1	0	1
RAI1V4_90	Unrestricted	Body	34	24	10	10
RAI1V4_90	Unrestricted	Body white slip	1	1	0	1
RAI1V5_67	Restricted	Appliqué	1	1	0	1
RAI1V5_67	Restricted	Body	43	26	17	10
RAI1V5_67	Restricted	Rim	1	0	1	1
RAI1V5_67	Restricted	Shoulder	2	2	0	0
RAI1V5_67	NI	Body	3	2	1	0
RAI1V5_67	NI	Rim	1	1	0	1
RAI1V5_67	Unrestricted	Base	2	1	1	2
RAI1V5_67	Unrestricted	Body	57	43	14	16
RAI1V5_67	Unrestricted	Body incised	4	4	0	4
RAI1V5_67	Unrestricted	Body white slip	8	5	3	6
RAI1V5_67	Unrestricted	Rim	1	0	1	1
RAI1V5_99	Restricted	Body	26	14	12	8
RAI1V5_99	Restricted	Body white slip	1	0	1	1
RAI1V5_99	Restricted	Rim/Neck	2	0	2	2
RAI1V5_99	Restricted	Rim/Neck w/incisions	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
RAI1V5_99	Restricted	Shoulder	1	0	1	1
RAI1V5_99	NI	Appliqué	1	1	0	1
RAI1V5_99	NI	Body	8	5	3	0
RAI1V5_99	NI	Body incised	1	0	1	1
RAI1V5_99	NI	Rim	1	0	1	1
RAI1V5_99	Unrestricted	Base	3	1	2	1
RAI1V5_99	Unrestricted	Body	43	36	7	12
RAI1V5_99	Unrestricted	Body incised	1	0	1	1
RAI1V5_99	Unrestricted	Body white slip	3	2	1	3
RAI1V5_99	Unrestricted	Rim/Neck	1	1	0	1
RAI1VI5_96	Restricted	Base	1	0	1	1
RAI1VI5_96	Restricted	Body	62	46	16	20
RAI1VI5_96	Restricted	Neck	4	4	0	0
RAI1VI5_96	Restricted	Neck incised	1	0	1	1
RAI1VI5_96	Restricted	Rim/Neck w/incisions	1	1	0	1
RAI1VI5_96	Restricted	Shoulder	1	0	1	1
RAI1VI5_96	Restricted	Shoulder incised	1	0	1	1
RAI1VI5_96	NI	Body white slip	1	0	1	1
RAI1VI5_96	Unrestricted	Base	3	3	0	3
RAI1VI5_96	Unrestricted	Body	30	26	4	10
RAI1VI5_96	Unrestricted	Body white slip	4	3	1	4
RAI1VI5_96	Unrestricted	Rim	1	0	1	1
RAI1VIII5_103	Restricted	Body	5	3	2	5
RAI1VIII5_103	Restricted	Neck incised	2	0	2	2
RAI1VIII5_103	NI	Body	1	0	1	1
RAI1VIII5_103	Unrestricted	Body	4	2	2	4
RAI1VIII5_103	Unrestricted	Body white slip	2	2	0	2
RAI1VIII5_113	Restricted	Body	2	0	2	2
RAI1VIII5_113	Restricted	Shoulder	1	0	1	1
RAI1VIII5_113	Unrestricted	Body	3	2	1	3
RAI1VIII5_113	Unrestricted	Body white slip	1	1	0	1
RAI1VIII6_124	Restricted	Body	1	1	0	1
RAI1VIII6_124	Restricted	Shoulder incised	1	1	0	1
RAI1VIII6_124	Unrestricted	Body	3	1	2	3
RAI1VIII7_129	Restricted	Body	2	1	1	2
RAI1VIII7_129	Unrestricted	Body	2	1	1	2
RAI1VIII8_134	Restricted	Body	3	2	1	3
RAI1VIII8_134	Unrestricted	Body	1	0	1	1
RAI1VIII9_136	Restricted	Body	1	0	1	1
RAI1VIII9_136	Unrestricted	Body	2	1	1	2
RDO1AV3_2	NI	Body	2	0	2	0
RDO1AV4_4	NI	Body	1	0	1	0
RDO1AVA4_7	Restricted	Body	1	0	1	0
RDO1AVA4_7	NI	Body	1	1	0	0
RDO1AVA4_7	Unrestricted	Body	3	1	2	0
RDO1AVA5_10	Restricted	Body	5	2	3	2
RDO1AVA5_10	NI	Body	2	2	0	0
RDO1AVA5_10	Unrestricted	Body	5	2	3	2
RDO1AVA5_9	NI	Rim/Neck	1	0	1	1
RDO1AVII6_15	Restricted	Body	1	0	1	1
RDO1AVII6_15	Unrestricted	Body	1	1	0	1
RDO1AX3_17	NI	Body	1	0	1	0
RDO1BX2_19	Restricted	Body	1	0	1	1
RDO1BX2_20	Restricted	Body	2	2	0	0
RDO1BX2_20	NI	Body	1	1	0	0
RDO1BXI3_21	NI	Body incised	1	1	0	0
RDO1BXI3_21	Unrestricted	Body	1	0	1	0
RDO1BXI3_22	NI	Body	3	2	1	1
RDO1BXI3_22	Unrestricted	Body incised	1	0	1	1
RDO1BXI4_23	Restricted	Body	5	2	3	3
RDO1BXI4_23	Restricted	Body incised	1	0	1	1
RDO1BXI4_23	Restricted	Shoulder incised w/appliqué	1	1	0	1
RDO1BXI4_23	Unrestricted	Body	1	1	0	1
RDO1BXI4_25	NI	Body	2	1	1	0
RDO1BXI4_31	Unrestricted	Body	1	0	1	1
RDO1BXII4_4	NI	Body	1	0	1	0
RDO1BXII4_40	NI	Body	1	0	1	0
RDO1BXII4_47	Restricted	Body	2	0	2	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
RDO1BXII4_47	NI	Body	1	1	0	0
RDO1BXII4_47	Unrestricted	Body	8	6	2	2
RDO1BXII5_54	NI	Body	1	0	1	1
RDO1BXII5_57	Restricted	Body	1	0	1	1
RDO1BXII5_58	Unrestricted	Body	1	0	1	1
RDO1BXII5_59	Restricted	Body	1	0	1	1
RDO1BXV_37	Restricted	Body	1	0	1	1
RDO1BXV4_29	Restricted	Body	1	0	1	0
RDO1BXV4_29	Restricted	Shoulder	1	0	1	0
RDO1BXV4_29	NI	Body	2	2	0	0
RDO1BXV4_32	Restricted	Body	1	0	1	0
RDO1BXV4_32	Restricted	Body incised	2	0	2	2
RDO1BXV4_32	NI	Body	2	0	2	0
RDO1BXV4_32	Unrestricted	Body	2	1	1	1
RDO1BXV4_32	Unrestricted	Body incised	1	0	1	1
RDO1BXV4_32	Unrestricted	Rim	1	1	0	1
RDO1BXV4_39	NI	Body	1	1	0	0
RDO1BXV4_41	Unrestricted	Base	1	0	1	1
RDO1BXV4_42	Unrestricted	Body	1	0	1	1
RDO1BXV4_43	NI	Rim	1	0	1	1
RDO1BXV5_53	Restricted	Body	5	1	4	2
RDO1BXV5_53	NI	Body	2	2	0	0
RDO1BXV5_53	Unrestricted	Body	1	1	0	1
RDO1BXVII5_55	Restricted	Body	1	0	1	1
RDO1BXVII5_55	Unrestricted	Body	2	1	1	2
RDO1BXVII5_61	Restricted	Body	2	1	1	2
RDO1BXVII6_62	Restricted	Body	1	0	1	1
RDO1BXVII8_66	Unrestricted	Rim/Neck	1	0	1	1
RDO1V4_5	Restricted	Body	1	0	1	0
RDO1V4_5	NI	Body	1	1	0	0
RDO1V4_5	Unrestricted	Body	2	0	2	0
RDO1XVII5_60	Restricted	Body	1	0	1	1
RDO2H1_2	NI	Body	1	1	0	0
RDO2H1_2	Unrestricted	Body	1	0	1	0
RDO2I1_4	Restricted	Body	27	21	6	9
RDO2I1_4	Restricted	Body incised	2	2	0	1
RDO2I1_4	NI	Body	33	23	10	8
RDO2I1_4	NI	Body incised	1	1	0	0
RDO2I1_4	NI	Rim	3	2	1	1
RDO2I1_4	NI	Rim/Neck	1	0	1	1
RDO2I1_4	NI	Support	4	4	0	4
RDO2I1_4	Unrestricted	Base	1	0	1	1
RDO2I1_4	Unrestricted	Body	20	9	11	6
RDO2I1_4	Unrestricted	Body incised	1	1	0	1
RDO2I1_4	Unrestricted	Rim/Neck	2	0	2	2
RDO2I2_13	Unrestricted	Body	1	1	0	1
RDO2I2_5	Restricted	Base	1	0	1	1
RDO2I2_5	Restricted	Body	5	0	5	2
RDO2I2_5	Restricted	Rim/Neck	1	0	1	1
RDO2I2_5	NI	Body	4	4	0	0
RDO2I2_5	NI	Support	1	0	1	1
RDO2I2_5	Unrestricted	Body	14	3	11	4
RDO2I2_5	Unrestricted	Rim/Neck	1	0	1	1
RDO2I2_5	Unrestricted	Rim/Neck w/appliqué	1	0	1	1
RDO2II2_9	Restricted	Body	6	1	5	3
RDO2II2_9	Restricted	Neck	1	0	1	1
RDO2II2_9	NI	Base	1	0	1	1
RDO2II2_9	Unrestricted	Body	33	16	17	9
RDO2II2_9	Unrestricted	Rim w/incisions	1	0	1	1
RDO2II2-3_12	Unrestricted	Body incised	1	0	1	1
RDO2II3_7	Unrestricted	Body	1	0	1	1
RDO2IIIA4_10	NI	Body	1	1	0	1
RDO2IIIA4_10	Unrestricted	Body	1	0	1	1
SR1II2_4	Restricted	Body	7	2	5	7
SR1II2_4	Restricted	Neck	1	0	1	1
SR1II2_4	Unrestricted	Body	2	2	0	2
SR1II2_4	Unrestricted	Body incised	1	0	1	1
SR1II3_9	Restricted	Body	31	14	17	31

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
SR1II3_9	Restricted	Rim/Neck	4	0	4	4
SR1II3_9	Restricted	Shoulder	1	0	1	1
SR1II3_9	Unrestricted	Body	20	11	9	20
SR1II3_9	Unrestricted	Rim/Neck	2	0	2	2
SR1III3_8	Restricted	Body	2	1	1	2
SR1III3_8	Restricted	Neck	1	0	1	1
SR1III3_8	Restricted	Rim/Neck	1	0	1	1
SR1III3_8	Unrestricted	Body	1	1	0	1
SRH1I2_3	Restricted	Body	5	3	2	5
SRH1I2_3	Restricted	Rim	2	1	1	2
SRH1I2_3	NI	Body	1	0	1	1
SRH1I2_3	Unrestricted	Body	3	3	0	3
SRH1I2_3	Unrestricted	Rim	1	1	0	1
SRH1Ia2_4	Restricted	Body	18	12	6	18
SRH1Ia2_4	Restricted	Neck	2	2	0	2
SRH1Ia2_4	NI	Body	4	2	2	4
SRH1Ia2_4	NI	Rim	1	1	0	1
SRH1Ia2_4	Unrestricted	Body	26	19	7	26
SRH1Ia2_4	Unrestricted	Rim	3	3	0	3
SRH1Ia3_21	Restricted	Body	2	2	0	2
SRH1Ia3_21	Unrestricted	Body	10	5	5	10
SRH1Ia3_5	Restricted	Body	2	0	2	2
SRH1Ia3_5	NI	Rim	1	1	0	1
SRH1Ia3_5	Unrestricted	Body	6	3	3	6
SRH1II2_7	Restricted	Body	8	4	4	8
SRH1II2_7	Restricted	Neck	1	0	1	1
SRH1II2_7	Restricted	Rim/Neck	1	0	1	1
SRH1II2_7	NI	Body	1	0	1	1
SRH1II2_7	Unrestricted	Body	13	10	3	13
SRH1II2_7	Unrestricted	Rim	1	1	0	1
SRH1II3_10	Restricted	Body	9	3	6	9
SRH1II3_10	NI	Body	1	0	1	1
SRH1II3_10	NI	Rim/Neck	1	1	0	1
SRH1II3_10	Unrestricted	Body	15	9	6	15
SRH1II3_10	Unrestricted	Rim	1	1	0	1
SRH1IIa2_13	Restricted	Body	10	3	7	10
SRH1IIa2_13	Restricted	Rim	1	1	0	1
SRH1IIa2_13	Restricted	Shoulder	1	0	1	1
SRH1IIa2_13	Unrestricted	Body	13	8	5	13
SRH1IIa2_14	Restricted	Body	1	0	1	1
SRH1IIa2_14	Unrestricted	Body	4	1	3	4
SRH1IIa2_14	Unrestricted	Rim/Neck	3	1	2	3
SRH1IIa3_15	Restricted	Body	2	2	0	2
SRH1IIa3_15	Unrestricted	Body	2	0	2	2
SRH1IIa3_18	Unrestricted	Body	4	2	2	4
SRH1IIa3_19	Unrestricted	Body	1	0	1	1
SRH1IIa3_20	Restricted	Body	1	1	0	0
SRH1IIa3_20	Unrestricted	Body	1	0	1	0
SRH1IIa3_22	Restricted	Body	4	2	2	4
SRH1IIa3_22	Restricted	Neck	1	1	0	1
SRH1IIa3_22	NI	Body	2	2	0	2
SRH1IIa3_22	NI	Rim	1	1	0	1
SRH1IIa3_22	Unrestricted	Body	12	9	3	12
SRH1IIa3_24	Unrestricted	Body	1	1	0	1
SRH1IIa3_24	Unrestricted	Body glazed	1	1	0	1
SRH1IIa3_24	Unrestricted	Rim/Neck	1	0	1	1
SRH1IIa3_24	Unrestricted	Rim/Neck glazed	1	1	0	1
SRH1IIa3_25	Restricted	Body	9	4	5	9
SRH1IIa3_25	Unrestricted	Body	12	8	4	12
SRH1IIa3_25	Unrestricted	Rim	1	1	0	1
SRH1IIa3_26	Restricted	Base	1	1	0	1
SRH1IIa3_26	Restricted	Body	4	0	4	4
SRH1IIa3_26	Restricted	Neck	1	0	1	1
SRH1IIa3_26	NI	Body	1	0	1	1
SRH1IIa3_26	NI	Rim/Neck	1	0	1	1
SRH1IIa3_26	Unrestricted	Body	8	4	4	8
SRH1IIa3_26	Unrestricted	Rim	1	1	0	1
SRH1IIa3_26	Unrestricted	Rim/Neck	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
SRH1IIa3_29	Restricted	Body	5	5	0	5
SRH1IIa3_29	Restricted	Neck	1	1	0	1
SRH1IIa3_29	Restricted	Shoulder	1	1	0	1
SRH1IIa3_29	NI	Body	1	1	0	1
SRH1IIa3_29	Unrestricted	Body	14	5	9	14
SRH1IIa3_29	Unrestricted	Rim	4	3	1	4
SRH1IIa3_30	Restricted	Body	3	2	1	3
SRH1IIa3_30	Restricted	Rim	1	1	0	1
SRH1IIa3_30	NI	Body	2	2	0	2
SRH1IIa3_30	Unrestricted	Body	10	4	6	10
SRH1IIa3_30	Unrestricted	Rim/Neck	1	0	1	1
SRH1IIa3_31	Restricted	Body	4	1	3	4
SRH1IIa3_31	NI	Body	1	0	1	1
SRH1IIa3_31	Unrestricted	Body	1	1	0	1
SRH1IIa3_31	Unrestricted	Rim	1	0	1	1
SRH1IIa3_32	Restricted	Body	2	2	0	2
SRH1IIa3_32	Unrestricted	Body	3	1	2	3
SRH1IIa3_32	Unrestricted	Rim	1	1	0	1
SRH1IIa3_34	Restricted	Body	1	0	1	1
SRH1IIa3_34	NI	Body	1	1	0	1
SRH1IIa3_34	Unrestricted	Body	4	4	0	4
SRH1IIa3_34	Unrestricted	Rim/Neck	1	0	1	1
SRH1IIa3_37	Restricted	Body	2	1	1	2
SRH1IIa3_37	Unrestricted	Body	10	7	3	10
SRH1IIa4_38	Restricted	Body	1	0	1	1
SRH1IIa4_38	NI	Body	1	0	1	1
SRH1IIa4_38	NI	Rim	1	1	0	1
SRH1IIa4_38	Unrestricted	Body	9	4	5	9
SRH1IIa4_39	Restricted	Body	1	1	0	1
SRH1IIa4_39	Unrestricted	Body	1	0	1	1
SRH1S2_2	Restricted	Body	17	11	6	17
SRH1S2_2	Restricted	Rim	1	0	1	1
SRH1S2_2	Unrestricted	Body	19	14	5	19
SRH1SS_11	Unrestricted	Body	1	1	0	1
SRH1SS_11	Unrestricted	Body glazed	5	3	2	5
SRH1SS_11	Unrestricted	Rim/Neck glazed	2	1	1	2
SRH1T3_17	Restricted	Body	3	2	1	3
SRH1T3_17	NI	Rim	2	0	2	2
SRH1T3_17	Unrestricted	Body	9	5	4	9
SRH1T3_17	Unrestricted	Rim	1	1	0	1
SRH1T3_17	Unrestricted	Rim/Neck	1	0	1	1
SRH1T3_28	Restricted	Body	1	0	1	1
SRH1T3_28	Unrestricted	Body	5	3	2	5
SRH1T3_28	Unrestricted	Rim/Neck	2	0	2	2
UBI1A??_	Restricted	Body	1	1	0	0
UBI1A??_	Unrestricted	Body	9	5	4	0
UBI1AIB5_4	Restricted	Body	17	12	5	5
UBI1AIB5_4	Restricted	Rim/Neck	2	2	0	2
UBI1AIB5_4	NI	Body	32	32	0	1
UBI1AIB5_4	NI	Rim	3	3	0	0
UBI1AIB5_4	Unrestricted	Base	45	35	10	15
UBI1AIB5_4	Unrestricted	Body	91	30	61	30
UBI1AIB5_4	Unrestricted	Rim	3	3	0	2
UBI1AIB5_4	Unrestricted	Rim/Neck	9	6	3	9
UBI1AIII6_13	Restricted	Body	1	1	0	0
UBI1AIII6_13	NI	Base	2	0	2	2
UBI1AIII6_13	NI	Body	4	2	2	1
UBI1AIII6_13	Unrestricted	Base	6	2	4	4
UBI1AIII6_13	Unrestricted	Body	18	10	8	6
UBI1AIII6_13	Unrestricted	Rim/Neck	2	0	2	0
UBI1AIII6_16	Restricted	Body	4	3	1	1
UBI1AIII6_16	NI	Body	5	3	2	1
UBI1AIII6_16	Unrestricted	Base	10	5	5	6
UBI1AIII6_16	Unrestricted	Body	26	19	7	7
UBI1AIII6_16	Unrestricted	Body incised	1	1	0	1
UBI1AIII6_16	Unrestricted	Rim/Neck	3	0	3	3
UBI1BI4_2	NI	Base	1	0	1	0
UBI1BI4_2	NI	Body	4	2	2	0

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
UBI1BIB5_10	NI	Support	1	0	1	0
UBI1BIB5_11	NI	Body	1	0	1	1
UBI1BIB5_14	NI	Body	1	0	1	1
UBI1BIB5_46	Restricted	Body	1	1	0	0
UBI1BIB5_46	Restricted	Rim/Neck	1	0	1	1
UBI1BIB5_46	NI	Base	1	0	1	1
UBI1BIB5_46	NI	Body	1	1	0	0
UBI1BIB5_46	Unrestricted	Base	2	0	2	2
UBI1BIB5_46	Unrestricted	Body	7	4	3	2
UBI1BIB5_46	Unrestricted	Rim/Neck	1	0	1	1
UBI1BIB5_56	Restricted	Neck	1	0	1	1
UBI1BIB5_56	Unrestricted	Body	1	1	0	1
UBI1BIB5_8	Restricted	Body	8	2	6	3
UBI1BIB5_8	Restricted	Rim/Neck	1	0	1	1
UBI1BIB5_8	Restricted	Shoulder	1	0	1	0
UBI1BIB5_8	Restricted	Shoulder/Neck	1	1	0	1
UBI1BIB5_8	NI	Body	53	44	9	9
UBI1BIB5_8	NI	Rim	5	5	0	0
UBI1BIB5_8	NI	Rim/Neck	1	0	1	1
UBI1BIB5_8	Unrestricted	Base	13	4	9	9
UBI1BIB5_8	Unrestricted	Body	114	62	52	36
UBI1BIB5_8	Unrestricted	Body excavated	1	0	1	1
UBI1BIB5_8	Unrestricted	Rim	2	1	1	0
UBI1BIB5_8	Unrestricted	Rim/Neck	4	2	2	4
UBI1BIB5_9	Unrestricted	Rim/Neck	1	0	1	1
UBI1BIII5_49	Unrestricted	Rim/Neck	1	0	1	1
UBI1BIII5_52	Unrestricted	Body	4	2	2	0
UBI1BIII5_55	Restricted	Body	1	1	0	1
UBI1BIII5_55	Unrestricted	Base	2	0	2	2
UBI1BIII5_55	Unrestricted	Body	1	0	1	1
UBI1BIII5_55	Unrestricted	Body white slip	3	1	2	2
UBI1BIII5_60	Unrestricted	Base	1	0	1	1
UBI1BIII5_60	Unrestricted	Base w/white slip	1	0	1	1
UBI1BIII5_60	Unrestricted	Body	15	10	5	5
UBI1BIII5_60	Unrestricted	Body white slip	1	1	0	1
UBI1BIII6_18	NI	Body	12	7	5	3
UBI1BIII6_18	NI	Rim	3	1	2	0
UBI1BIII6_18	Unrestricted	Base	6	1	5	4
UBI1BIII6_18	Unrestricted	Body	61	46	15	20
UBI1BIII6_18	Unrestricted	Body white slip	1	0	1	1
UBI1BIII6_18	Unrestricted	Rim/Neck	2	0	2	2
UBI1CI4_22	NI	Body	1	0	1	0
UBI1CI4_22	Unrestricted	Body	1	1	0	0
UBI1CXI1_20	Restricted	Body	4	2	2	3
UBI1CXI1_20	Restricted	Neck	1	0	1	1
UBI1CXI1_20	Restricted	Shoulder	3	0	3	3
UBI1CXI1_20	NI	Base	3	0	3	1
UBI1CXI1_20	NI	Body	42	30	12	10
UBI1CXI1_20	NI	NI	1	0	1	0
UBI1CXI1_20	Unrestricted	Base	5	3	2	2
UBI1CXI1_20	Unrestricted	Body	46	25	21	0
UBI1CXI1_20	Unrestricted	Rim	2	1	1	2
UBI1CXI1_20	Unrestricted	Rim/Neck	4	0	4	4
UBI1CXI1_24	NI	Support	1	0	1	1
UBI1CXI2_25	Restricted	Base	1	1	0	0
UBI1CXI2_25	Restricted	Body	3	2	1	1
UBI1CXI2_25	Restricted	Neck	1	0	1	1
UBI1CXI2_25	Restricted	Rim/Neck	2	0	2	2
UBI1CXI2_25	Restricted	Shoulder	1	0	1	1
UBI1CXI2_25	NI	Base	1	1	0	1
UBI1CXI2_25	NI	Body	24	19	5	3
UBI1CXI2_25	NI	Rim	1	0	1	0
UBI1CXI2_25	Unrestricted	Base	5	4	1	2
UBI1CXI2_25	Unrestricted	Body	78	50	28	28
UBI1CXI2_25	Unrestricted	Body with appliqué	1	0	1	1
UBI1CXI2_25	Unrestricted	Rim	2	2	0	1
UBI1CXI2_25	Unrestricted	Rim/Neck	5	0	5	5
UBI1CXI3_27	Restricted	Base	1	0	1	0

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
UBI1CXI3_27	Restricted	Body	3	0	3	1
UBI1CXI3_27	Restricted	Body with appliqué	1	0	1	1
UBI1CXI3_27	NI	Body	25	18	7	70
UBI1CXI3_27	Unrestricted	Base	22	4	18	0
UBI1CXI3_27	Unrestricted	Body	64	26	38	21
UBI1CXI3_27	Unrestricted	Body white slip	4	0	4	4
UBI1CXI3_27	Unrestricted	Rim	2	0	2	1
UBI1CXI3_27	Unrestricted	Rim/Neck	6	0	6	6
UBI1CXI3_30	Restricted	Base	1	1	0	0
UBI1CXI3_30	NI	Body	5	5	0	0
UBI1CXI3_30	NI	Rim	1	1	0	0
UBI1CXI3_30	NI	Support	1	0	1	1
UBI1CXI3_30	Unrestricted	Base	15	7	8	7
UBI1CXI3_30	Unrestricted	Body	43	26	17	15
UBI1CXI3_30	Unrestricted	Body white slip	7	1	6	3
UBI1CXI3_30	Unrestricted	Body with appliqué	1	1	0	1
UBI1CXI3_30	Unrestricted	Rim	1	0	1	1
UBI1CXI4_35	NI	Body	2	1	1	1
UBI1CXI4_35	Unrestricted	Base	5	2	3	2
UBI1CXI4_35	Unrestricted	Body	17	8	9	6
UBI1CXI4_35	Unrestricted	Body white slip	1	0	1	1
UBI1CXI4_35	Unrestricted	Rim/Neck	1	0	1	1
UBI1CXII5_53	Restricted	Body	5	5	0	0
UBI1CXII5_53	Restricted	Rim/Neck	1	0	1	1
UBI1CXII5_53	NI	Body	1	0	1	0
UBI1CXII5_53	Unrestricted	Base	5	0	5	5
UBI1CXII5_53	Unrestricted	Body	37	9	28	12
UBI1CXII5_53	Unrestricted	Body white slip	5	2	3	3
UBI1CXII5_53	Unrestricted	Rim/Neck	3	0	3	3
UBI1CXIII4_36	Restricted	Neck	1	0	1	1
UBI1CXIII4_36	NI	Body	3	3	0	0
UBI1CXIII4_36	NI	Support	1	0	1	1
UBI1CXIII4_36	Unrestricted	Base	9	3	6	7
UBI1CXIII4_36	Unrestricted	Body	27	14	13	0
UBI1CXIII4_36	Unrestricted	Body white slip	5	3	2	4
UBI1CXIII4_36	Unrestricted	Rim w/white slip	1	0	1	1
UBI1CXIII4_36	Unrestricted	Rim/Neck	1	1	0	1
UBI1CXIII5_43	Restricted	Base	3	0	3	1
UBI1CXIII5_43	Restricted	Body	2	1	1	0
UBI1CXIII5_43	Restricted	Neck	1	0	1	1
UBI1CXIII5_43	NI	Base	2	0	2	1
UBI1CXIII5_43	NI	Body	14	4	10	5
UBI1CXIII5_43	NI	Rim	1	1	0	0
UBI1CXIII5_43	Unrestricted	Base	12	4	8	8
UBI1CXIII5_43	Unrestricted	Base w/white slip	2	0	2	2
UBI1CXIII5_43	Unrestricted	Body	49	20	29	0
UBI1CXIII5_43	Unrestricted	Body white slip	4	2	2	4
UBI1CXIII5_43	Unrestricted	Body with appliqué	1	0	1	1
UBI1CXIII5_43	Unrestricted	Rim	1	1	0	0
UBI1CXIII5_43	Unrestricted	Rim/Neck	4	1	3	4
UBI1CXIII5_51	Unrestricted	Body	4	1	3	4
UBI1CXIII5_51	Unrestricted	Rim/Neck	1	0	1	1
UBI1CXIII5_63	Unrestricted	Body	2	0	2	2
UBI1III5_67	Unrestricted	Body	5	2	3	0
UBI2I-1_2	NI	Body	3	2	1	1
UBI2I-1_2	Unrestricted	Body	14	6	8	7
UBI2I-1_2	Unrestricted	Rim	2	2	0	2
UBI2I-1_2	Unrestricted	Rim/Neck	2	0	2	2
UBI2I-1_4	NI	Teja?	10	6	4	0
UBI2IA0_7	Restricted	Body	7	3	4	2
UBI2IA0_7	NI	Base	1	0	1	1
UBI2IA0_7	NI	Body	15	8	7	5
UBI2IA0_7	NI	Rim	1	1	0	1
UBI2IA0_7	Unrestricted	Base	4	1	3	3
UBI2IA0_7	Unrestricted	Body	38	13	25	12
UBI2IA0_7	Unrestricted	Rim/Neck	5	1	4	5
UBI2IV1_15	Restricted	Body	2	2	0	0
UBI2IV1_15	Restricted	Rim/Neck w/appliqué	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
UBI2IV1_15	NI	Body	4	4	0	1
UBI2IV1_15	NI	Rim/Neck	1	0	1	1
UBI2IV1_15	Unrestricted	Body	11	8	3	3
UBI2IV2_20	Restricted	Body	1	1	0	1
UBI2IV2_20	Restricted	Rim/Neck	1	0	1	1
UBI2IV2_20	NI	Body	6	2	4	2
UBI2IV2_20	Unrestricted	Body	2	1	1	2
UBI2VI1_12	Restricted	Body	2	0	2	2
UBI2VI1_12	Restricted	Rim/Neck	1	0	1	1
UBI2VI1_12	NI	Body	4	3	1	1
UBI2VI1_12	NI	Rim/Neck	1	0	1	1
UBI2VI1_12	Unrestricted	Body	15	11	4	5
UBI2VI1_12	Unrestricted	Rim/Neck	1	1	0	1
UBI2VI1_17	Unrestricted	Body	1	1	0	1
UBI2VI1_19	NI	Body	1	1	0	0
UBI2VI1_19	NI	Rim/Neck	1	0	1	1
UBI2VI1_19	Unrestricted	Rim/Neck	1	0	1	1
UBI3A?_84	Restricted	Body	4	3	1	0
UBI3A?_84	Restricted	Shoulder	1	0	1	0
UBI3A?_84	Unrestricted	Body	3	2	1	0
UBI3A?_84	Unrestricted	Rim/Neck	2	1	1	0
UBI3AA12_81	Restricted	Body	3	1	2	2
UBI3AA12_81	NI	Rim	1	1	0	0
UBI3AA12_81	Unrestricted	Body	2	1	1	2
UBI3AAI11_83	Restricted	Body	1	0	1	1
UBI3AAI11_83	Unrestricted	Body	1	0	1	1
UBI3AAI11_83	Unrestricted	Body white slip	1	1	0	1
UBI3AAVIII12_79	Restricted	Body	1	0	1	0
UBI3AAVIII12_79	Unrestricted	Body	4	3	1	0
UBI3AAVIII12_79	Unrestricted	Body white slip	1	0	1	0
UBI3AAVIIIF313_80	NI	Base	3	2	1	0
UBI3AAVIIIF313_80	NI	Body	6	6	0	0
UBI3AAVIIIF313_80	NI	Body w/white slip & appliqué	1	0	1	1
UBI3AAVIIIF313_80	Unrestricted	Base	11	4	7	11
UBI3AAVIIIF313_80	Unrestricted	Body	31	20	11	11
UBI3AAVIIIF313_80	Unrestricted	Body white slip	1	1	0	1
UBI3AAVIIIF313_80	Unrestricted	Rim w/incisions	1	1	0	1
UBI3AAVIIIF313_80	Unrestricted	Rim/Neck	1	0	1	1
UBI3AAVIIIF313_80	Unrestricted	Rim/Neck w/incisions	1	0	1	1
UBI3ABVIII12_17	Restricted	Body	8	3	5	5
UBI3ABVIII12_17	Restricted	Body w/white slip & appliqué	1	0	1	1
UBI3ABVIII12_17	Restricted	Neck	2	0	2	2
UBI3ABVIII12_17	Restricted	Rim/Neck	2	0	2	2
UBI3ABVIII12_17	NI	Body	8	5	3	3
UBI3ABVIII12_17	NI	Rim	1	0	1	0
UBI3ABVIII12_17	NI	Support	2	1	1	2
UBI3ABVIII12_17	Unrestricted	Base	28	6	22	14
UBI3ABVIII12_17	Unrestricted	Body	106	50	56	35
UBI3ABVIII12_17	Unrestricted	Body white slip	2	0	2	2
UBI3ABVIII12_17	Unrestricted	Rim/Neck	10	2	8	10
UBI3ABVIII12_20	Unrestricted	Support	1	0	1	1
UBI3ABVIII12_21	Restricted	Body	1	1	0	1
UBI3ABVIII12_21	Unrestricted	Support	1	0	1	1
UBI3ABVIII12_22	Unrestricted	Body	1	0	1	1
UBI3ABVIII13_24	Restricted	Base	1	1	0	1
UBI3ABVIII13_24	Restricted	Body	12	3	9	9
UBI3ABVIII13_24	Restricted	Body with appliqué	1	1	0	1
UBI3ABVIII13_24	Restricted	Neck w/white slip	1	0	1	1
UBI3ABVIII13_24	Figurine?	NI	1	1	0	1
UBI3ABVIII13_24	NI	Base	1	0	1	1
UBI3ABVIII13_24	NI	Body	19	18	1	1
UBI3ABVIII13_24	NI	Handle	1	0	1	1
UBI3ABVIII13_24	NI	NI	1	1	0	0
UBI3ABVIII13_24	NI	Support	1	0	1	1
UBI3ABVIII13_24	Unrestricted	Base	7	2	5	6
UBI3ABVIII13_24	Unrestricted	Base w/white slip	1	0	1	1
UBI3ABVIII13_24	Unrestricted	Body	99	68	31	31
UBI3ABVIII13_24	Unrestricted	Body w/white slip & appliqué	6	4	2	3

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
UBI3ABVIII13_24	Unrestricted	Body with appliqué	1	1	0	1
UBI3ABVIII13_24	Unrestricted	Lug	1	1	0	1
UBI3ABVIII13_24	Unrestricted	Rim	4	3	1	2
UBI3ABVIII13_24	Unrestricted	Rim/Neck	9	2	7	9
UBI3ABVIII13_26	Restricted	Base	3	0	3	3
UBI3ABVIII13_26	Restricted	Support	1	0	1	1
UBI3ABVIII13_26	NI	Body	14	10	4	4
UBI3ABVIII13_26	NI	Support	2	1	1	2
UBI3ABVIII13_26	Unrestricted	Base	12	10	2	8
UBI3ABVIII13_26	Unrestricted	Body	89	61	28	28
UBI3ABVIII13_26	Unrestricted	Rim/Neck	7	2	5	7
UBI3ABVIII13_26	Unrestricted	Rim/Neck w/white slip	1	0	1	0
UBI3ABVIII13_27	Restricted	Base	1	0	1	1
UBI3ABVIII13_27	Restricted	Body	7	3	4	3
UBI3ABVIII13_27	NI	Body	8	5	3	2
UBI3ABVIII13_27	NI	Support	1	0	1	1
UBI3ABVIII13_27	Unrestricted	Base	10	0	10	10
UBI3ABVIII13_27	Unrestricted	Base w/white slip	1	0	1	1
UBI3ABVIII13_27	Unrestricted	Body	73	36	37	26
UBI3ABVIII13_27	Unrestricted	Body white slip	1	1	0	0
UBI3ABVIII13_27	Unrestricted	Handle	1	1	0	1
UBI3ABVIII13_27	Unrestricted	Rim/Neck	6	1	5	6
UBI3ABVIII13_45	Restricted	Body	4	2	2	2
UBI3ABVIII13_45	Restricted	Neck	1	0	1	1
UBI3ABVIII13_45	Restricted	Rim	1	1	0	1
UBI3ABVIII13_45	Restricted	Rim/Neck	1	0	1	1
UBI3ABVIII13_45	NI	Base	1	0	1	0
UBI3ABVIII13_45	NI	Body	72	44	28	20
UBI3ABVIII13_45	NI	Rim	3	3	0	1
UBI3ABVIII13_45	Unrestricted	Base	15	6	9	7
UBI3ABVIII13_45	Unrestricted	Base w/white slip	2	0	2	2
UBI3ABVIII13_45	Unrestricted	Body	60	30	30	20
UBI3ABVIII13_45	Unrestricted	Body with appliqué	1	1	0	1
UBI3ABVIII13_45	Unrestricted	Rim	2	1	1	1
UBI3ABVIII13_45	Unrestricted	Rim/Neck	8	0	8	8
UBI3ABVIII14_36	Restricted	Body	10	4	6	3
UBI3ABVIII14_36	Restricted	Body white slip	1	1	0	1
UBI3ABVIII14_36	Restricted	Rim	1	1	0	1
UBI3ABVIII14_36	NI	Base	3	0	3	1
UBI3ABVIII14_36	NI	Body	14	13	1	3
UBI3ABVIII14_36	NI	Rim	1	1	0	0
UBI3ABVIII14_36	NI	Zoomorphic appliqué	1	0	1	1
UBI3ABVIII14_36	Unrestricted	Base	17	7	10	10
UBI3ABVIII14_36	Unrestricted	Base w/white slip	1	0	1	1
UBI3ABVIII14_36	Unrestricted	Body	106	63	43	34
UBI3ABVIII14_36	Unrestricted	Body white slip	4	1	3	3
UBI3ABVIII14_36	Unrestricted	Rim	1	0	1	1
UBI3ABVIII14_36	Unrestricted	Rim/Neck	13	6	7	13
UBI3ABVIII14_39	Restricted	Body	12	8	4	4
UBI3ABVIII14_39	Restricted	Neck	1	0	1	1
UBI3ABVIII14_39	Restricted	Rim/Neck	1	0	1	1
UBI3ABVIII14_39	Restricted	Shoulder	4	2	2	4
UBI3ABVIII14_39	NI	Base	1	0	1	1
UBI3ABVIII14_39	NI	Body	18	16	2	6
UBI3ABVIII14_39	NI	Rim	3	3	0	0
UBI3ABVIII14_39	NI	Support	1	0	1	1
UBI3ABVIII14_39	Unrestricted	Base	8	5	3	4
UBI3ABVIII14_39	Unrestricted	Body	104	63	41	40
UBI3ABVIII14_39	Unrestricted	Body white slip	5	1	4	5
UBI3ABVIII14_39	Unrestricted	Handle	1	1	0	1
UBI3ABVIII14_39	Unrestricted	Rim	3	2	1	1
UBI3ABVIII14_39	Unrestricted	Rim/Neck	12	2	10	12
UBI3ABVIII14_39	Unrestricted	Rim/Neck w/appliqué	1	1	0	1
UBI3ABVIII14_39	Unrestricted	Support	1	0	1	1
UBI3ABVIII14_40	Restricted	Base	1	0	1	1
UBI3ABVIII14_40	Restricted	Body	4	2	2	2
UBI3ABVIII14_40	Restricted	Rim/Neck w/white slip	1	0	1	1
UBI3ABVIII14_40	NI	Body	26	24	2	8

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
UBI3ABVIII14_40	NI	Rim	1	1	0	0
UBI3ABVIII14_40	Unrestricted	Base	17	2	15	17
UBI3ABVIII14_40	Unrestricted	Base w/white slip	2	0	2	2
UBI3ABVIII14_40	Unrestricted	Body	84	63	21	25
UBI3ABVIII14_40	Unrestricted	Body white slip	7	2	5	7
UBI3ABVIII14_40	Unrestricted	Rim	1	1	0	0
UBI3ABVIII14_40	Unrestricted	Rim/Neck	6	1	5	6
UBI3ABX15_47	Restricted	Body	4	4	0	2
UBI3ABX15_47	NI	Body	23	19	4	4
UBI3ABX15_47	NI	Rim	4	0	4	2
UBI3ABX15_47	Unrestricted	Body	35	23	12	12
UBI3ABX15_47	Unrestricted	Body white slip	4	1	3	4
UBI3ABX15_47	Unrestricted	Rim/Neck	4	2	2	4
UBI3ABX16_48	Unrestricted	Body	2	1	1	2
UBI3ABXIV17_51	Unrestricted	Body	3	1	2	3
UBI3ABXIV17_51	Unrestricted	Rim/Neck	1	1	0	1
UBI3ABXIV20_69	NI	Body	1	1	0	1
UBI3ABXIV20_69	Unrestricted	Body	3	1	2	3
UBI3AI11_1	NI	Body	2	1	1	0
UBI3AI11_1	NI	Body w/white slip & appliqué	2	0	2	0
UBI3AI11_2	NI	Teja?	2	1	1	0
UBI3AV11_4	NI	Body	4	2	2	0
UBI3AV12_14	NI	Body	3	2	1	0
UBI3AV12_74	Restricted	Body	2	0	2	2
UBI3AV12_74	Restricted	Shoulder	1	1	0	1
UBI3AV12_74	Unrestricted	Body	5	4	1	5
UBI3AV12_74	Unrestricted	Rim/Neck	1	0	1	1
UBI3AVIII12_53	Restricted	Rim/Neck	1	0	1	1
UBI3AVIII12_53	NI	Body	7	3	4	1
UBI3AVIII12_53	NI	Rim	1	1	0	0
UBI3AVIII12_53	Unrestricted	Base	3	0	3	3
UBI3AVIII12_53	Unrestricted	Body	7	2	5	5
UBI3AVIII12_53	Unrestricted	Body white slip	1	0	1	1
UBI3AVIII12_53	Unrestricted	Rim	1	0	1	1
UBI3AVIII12_53	Unrestricted	Rim/Neck	3	0	3	3
UBI3AVIII12_53	Unrestricted	Support white slip	1	0	1	1
UBI3AVIIIF313_75	NI	Body	2	1	1	0
UBI3AVIIIF313_75	Unrestricted	Base	2	1	1	2
UBI3AVIIIF313_75	Unrestricted	Body	11	6	5	5
UBI3AVIIIF313_75	Unrestricted	Body white slip	1	0	1	1
UBI3AVIIIF313_75	Unrestricted	Rim/Neck	1	0	1	1
UBI3AX15_78	NI	Body	2	1	1	2
UBI3AXIV19_52	NI	Body	1	0	1	0
UBI3B??_87	Unrestricted	Base	2	0	2	0
UBI3B??_87	Unrestricted	Body	9	4	5	0
UBI3BCX16_61	Restricted	Body	11	4	7	7
UBI3BCX16_61	NI	Base	1	0	1	1
UBI3BCX16_61	NI	Body	16	8	8	5
UBI3BCX16_61	Unrestricted	Rim/Neck	3	0	3	3
UBI3BF1A11_6	NI	Body	2	2	0	0
UBI3BF1A11_6	Unrestricted	Body	6	5	1	0
UBI3BF1A12_10	Unrestricted	Body	2	0	2	2
UBI3BF1A12_11	Restricted	Body	3	1	2	0
UBI3BF1A12_11	NI	Body	1	0	1	0
UBI3BF1A12_11	Unrestricted	Body	1	1	0	0
UBI3BF1B12_12	NI	Body	1	0	1	1
UBI3BF1B12_13	Unrestricted	Body	1	0	1	1
UBI3BF1B12_18	Restricted	Shoulder/Neck	1	0	1	1
UBI3BF1B12_18	NI	Base	1	0	1	1
UBI3BF1B12_18	NI	Body	3	1	2	1
UBI3BF1B12_18	NI	Rim/Neck	1	1	0	1
UBI3BF1B12_18	Unrestricted	Base	2	1	1	1
UBI3BF1B12_18	Unrestricted	Body	10	5	5	3
UBI3BF1B12_18	Unrestricted	Rim/Neck	1	0	1	0
UBI3BI11_35	Restricted	Base	2	0	2	2
UBI3BI11_35	Restricted	Body	10	4	6	3
UBI3BI11_35	Restricted	Rim	1	1	0	1
UBI3BI11_35	Restricted	Shoulder	2	0	2	2

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
UBI3BI11_35	Restricted	Shoulder/Neck	1	0	1	1
UBI3BI11_35	NI	Body	9	7	2	2
UBI3BI11_35	Unrestricted	Base	12	7	5	5
UBI3BI11_35	Unrestricted	Body	29	22	7	10
UBI3BI11_35	Unrestricted	Rim/Neck	1	0	1	1
UBI3BI11_37	Restricted	Body	2	2	0	0
UBI3BI11_37	Unrestricted	Body	4	2	2	2
UBI3BI11_37	Unrestricted	Rim/Neck	1	0	1	1
UBI3BIIF111_5	NI	Body	4	3	1	0
UBI3BIIF111_5	NI	Rim	1	1	0	0
UBI3BIIF111_5	Unrestricted	Body	7	3	4	0
UBI3BV11_31	Restricted	Base	3	0	3	3
UBI3BV11_31	Restricted	Body	9	5	4	4
UBI3BV11_31	NI	Base	1	1	0	0
UBI3BV11_31	NI	Body	2	2	0	0
UBI3BV11_31	NI	Rim	2	1	1	1
UBI3BV11_31	Unrestricted	Base	8	3	5	6
UBI3BV11_31	Unrestricted	Body	15	10	5	5
UBI3BV11_31	Unrestricted	Rim/Neck	2	0	2	2
UBI3BV11_41	Restricted	Body	9	3	6	0
UBI3BV11_41	Restricted	Shoulder	1	0	1	1
UBI3BV11_41	NI	Body	14	10	4	4
UBI3BV11_41	Unrestricted	Base	21	6	15	7
UBI3BV11_41	Unrestricted	Body	70	44	26	26
UBI3BV11_41	Unrestricted	Body with appliqué	1	1	0	1
UBI3BV11_41	Unrestricted	Rim	2	0	2	0
UBI3BV11_41	Unrestricted	Rim/Neck	5	0	5	5
UBI3BV11_43	Restricted	Body	4	0	4	4
UBI3BV11_43	Restricted	Body white slip	1	0	1	1
UBI3BV11_43	Restricted	Neck	1	0	1	1
UBI3BV11_43	NI	Body	24	16	8	8
UBI3BV11_43	NI	Rim	1	0	1	0
UBI3BV11_43	Unrestricted	Base	31	15	16	11
UBI3BV11_43	Unrestricted	Body	97	60	37	37
UBI3BV11_43	Unrestricted	Body incised	2	2	0	2
UBI3BV11_43	Unrestricted	Body white slip	8	1	7	3
UBI3BV11_43	Unrestricted	Rim	1	0	1	0
UBI3BV11_43	Unrestricted	Rim/Neck	5	1	4	5
UBI3BV12_34	Unrestricted	Body	1	0	1	1
UBI3BVIIIA12_70	Restricted	Base	1	0	1	1
UBI3BVIIIA12_70	Restricted	Body	4	0	4	4
UBI3BVIIIA12_70	Restricted	Body white slip	2	1	1	2
UBI3BVIIIA12_70	Restricted	Neck	1	0	1	1
UBI3BVIIIA12_70	NI	Body	8	5	3	3
UBI3BVIIIA12_70	Unrestricted	Base	21	11	10	8
UBI3BVIIIA12_70	Unrestricted	Base w/white slip	2	1	1	2
UBI3BVIIIA12_70	Unrestricted	Body	29	5	24	10
UBI3BVIIIA12_70	Unrestricted	Rim	2	1	1	0
UBI3BVIIIA12_70	Unrestricted	Rim/Neck	7	2	5	6
UBI3BVIIIA12_70	Unrestricted	Support	2	0	2	2
UBI3BXV14_54	Restricted	Body	1	0	1	1
UBI3BXV14_54	NI	Body	15	10	5	5
UBI3BXV14_54	NI	Rim	1	0	1	0
UBI3BXV14_54	NI	Rim/Neck w/white slip	1	0	1	1
UBI3BXV14_54	Unrestricted	Base	10	2	8	10
UBI3BXV14_54	Unrestricted	Base w/white slip	1	0	1	1
UBI3BXV14_54	Unrestricted	Body	62	37	25	25
UBI3BXV14_54	Unrestricted	Body white slip	2	0	2	2
UBI3BXV14_54	Unrestricted	Body with appliqué	1	1	0	1
UBI3BXV14_54	Unrestricted	Rim	3	0	3	3
UBI3BXV14_54	Unrestricted	Rim/Neck	5	0	5	5
UBI3C??_85	Unrestricted	Body	2	1	1	0
UBI3C??_86	NI	Body	3	2	1	0
UBI3C??_86	Unrestricted	Body	5	2	3	0
UBI3C??_86	Unrestricted	Rim/Neck	1	0	1	0
UBI3C??_9	NI	Body	4	4	0	0
UBI3C??_9	Unrestricted	Body	4	3	1	0
UBI3CXIV16_67	NI	Body	2	1	1	2

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
UBI3CXV12_55	Restricted	Base	1	1	0	1
UBI3CXV12_55	Restricted	Body	27	16	11	11
UBI3CXV12_55	Restricted	Rim/Neck	1	0	1	1
UBI3CXV12_55	Restricted	Shoulder	2	1	1	2
UBI3CXV12_55	NI	Body	26	19	7	0
UBI3CXV12_55	NI	Rim	2	2	0	0
UBI3CXV12_55	NI	Support	1	0	1	1
UBI3CXV12_55	Unrestricted	Base	7	2	5	6
UBI3CXV12_55	Unrestricted	Base w/white slip	1	0	1	1
UBI3CXV12_55	Unrestricted	Body	124	87	37	33
UBI3CXV12_55	Unrestricted	Body white slip	1	0	1	1
UBI3CXV12_55	Unrestricted	Rim/Neck	8	3	5	8
UBI3CXV12_56	Restricted	Body	6	4	2	2
UBI3CXV12_56	Restricted	Rim/Neck	1	0	1	1
UBI3CXV12_56	Restricted	Shoulder	2	1	1	2
UBI3CXV12_56	NI	Base	3	2	1	1
UBI3CXV12_56	NI	Body	18	11	7	0
UBI3CXV12_56	NI	Lug	1	0	1	1
UBI3CXV12_56	NI	NI	1	0	1	1
UBI3CXV12_56	NI	Rim	3	3	0	0
UBI3CXV12_56	NI	Support	3	2	1	3
UBI3CXV12_56	Unrestricted	Base	7	4	3	6
UBI3CXV12_56	Unrestricted	Body	119	76	43	43
UBI3CXV12_56	Unrestricted	Body incised	1	1	0	1
UBI3CXV12_56	Unrestricted	Rim	5	4	1	1
UBI3CXV12_56	Unrestricted	Rim/Neck	15	6	9	15
UBI3CXV13_57	Restricted	Base	1	0	1	1
UBI3CXV13_57	Restricted	Body	4	3	1	1
UBI3CXV13_57	Restricted	Neck	1	0	1	1
UBI3CXV13_57	NI	Body	12	7	5	2
UBI3CXV13_57	Unrestricted	Base	23	12	11	16
UBI3CXV13_57	Unrestricted	Body	93	49	44	31
UBI3CXV13_57	Unrestricted	Body w/zoomorphic appliqué	1	0	1	1
UBI3CXV13_57	Unrestricted	Body white slip	1	1	0	1
UBI3CXV13_57	Unrestricted	Lug	1	0	1	1
UBI3CXV13_57	Unrestricted	Rim	2	1	1	0
UBI3CXV13_57	Unrestricted	Rim/Neck	7	3	4	7
UBI3CXV13_60	NI	Base	2	0	2	2
UBI3CXV13_60	NI	Body	7	5	2	2
UBI3CXV13_60	Unrestricted	Base	2	0	2	2
UBI3CXV13_60	Unrestricted	Body	23	12	11	11
UBI3CXV13_60	Unrestricted	Rim w/white slip	1	1	0	1
UBI3CXV13_60	Unrestricted	Rim/Neck	2	0	2	2
UBI3CXVII13_66	NI	Base	1	0	1	1
UBI3CXVII13_66	NI	Body	4	4	0	0
UBI3CXVII13_66	Unrestricted	Body	6	5	1	2
UBI3CXVII13_66	Unrestricted	Rim/Neck	3	1	2	3
WM1CH-5_44	Restricted	Body	1	0	1	0
WM1CH-5_44	NI	Body	1	1	0	0
WM1CI-5_45	Restricted	Body	3	0	3	1
WM1CI-5_45	Unrestricted	Body	3	1	2	1
WM1CI-5_45	Unrestricted	Rim/Neck	1	1	0	1
WM1CIIM-5_48	Restricted	Body	7	3	4	2
WM1CIIM-5_48	Restricted	Rim/Neck	1	0	1	1
WM1CIIM-5_48	NI	Body	1	0	1	0
WM1CIIM-5_48	Unrestricted	Body	8	2	6	2
WM1CIIM-5_48	Unrestricted	Rim/Neck	1	1	0	1
WM1I-4_31	Clay ball	NI	1	0	1	1
WM1I-5_30	Restricted	Body	5	0	5	2
WM1I-5_30	Restricted	Neck	1	0	1	1
WM1I-5_30	Restricted	Shoulder	1	0	1	1
WM1I-5_30	NI	Body	6	5	1	0
WM1I-5_30	Unrestricted	Body	6	2	4	2
WM1I-5_30	Unrestricted	Rim/Neck	2	0	2	2
WM1II-4_33	Restricted	Body	4	3	1	1
WM1II-4_33	NI	Base	2	0	2	1
WM1II-4_33	NI	Body	9	8	1	1
WM1II-4_33	Unrestricted	Base	1	0	1	1

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
WM1II-4_33	Unrestricted	Body	26	16	10	8
WM1II-4_33	Unrestricted	Body excavated	1	0	1	1
WM1II-4_33	Unrestricted	Rim/Neck	4	2	2	4
WM1IIC-4_10	NI	Body	1	1	0	0
WM1VII-4_38	Restricted	Neck	1	0	1	1
WM1VII-4_38	Restricted	Rim/Neck	1	0	1	1
WM1VII-4_38	NI	Body	2	1	1	1
WM1VII-4_38	Unrestricted	Body	5	1	4	2
WM1VII-4_38	Unrestricted	Rim/Neck	3	0	3	3
WM1VII-4_41	Restricted	Body	1	0	1	1
WM1VIII-4_42	Restricted	Body	1	0	1	1
WM1VIII-4_42	NI	Body	3	2	1	0
WM1VIII-4_42	Unrestricted	Body	2	0	2	2
WM1VIII-4_42	Unrestricted	Rim/Neck	1	0	1	1
WM2I-4_1	Restricted	Body	15	4	11	5
WM2I-4_1	Restricted	Neck	1	0	1	1
WM2I-4_1	Restricted	Rim/Neck	2	0	2	2
WM2I-4_1	NI	Body	9	5	4	3
WM2I-4_1	NI	Body with appliqué	1	0	1	1
WM2I-4_1	NI	Rim/Neck	4	1	3	4
WM2I-4_1	Unrestricted	Base	1	0	1	1
WM2I-4_1	Unrestricted	Body	22	9	13	0
WM2I-4_1	Unrestricted	Rim	3	2	1	3
WM2II&III?_20	Unrestricted	Body	1	0	1	0
WM2II-3_22	Restricted	Body	1	1	0	1
WM2II-3_22	Unrestricted	Body	2	1	1	2
WM2II-3_5	NI	Rim/Neck	1	0	1	1
WM2II-3_6	Restricted	Body	1	0	1	1
WM2II-3_7	Restricted	Body	17	8	9	6
WM2II-3_7	Restricted	Shoulder	1	0	1	1
WM2II-3_7	NI	Body	13	8	5	0
WM2II-3_7	Unrestricted	Body	22	14	8	7
WM2II-3_7	Unrestricted	Rim/Neck	4	3	1	4
WM2II-4_13	Restricted	Body	18	8	10	6
WM2II-4_13	Restricted	Neck	2	1	1	2
WM2II-4_13	Restricted	Shoulder	4	1	3	4
WM2II-4_13	NI	Body	26	19	7	2
WM2II-4_13	NI	Rim	1	0	1	0
WM2II-4_13	NI	Rim/Neck	1	0	1	1
WM2II-4_13	Unrestricted	Body	38	18	20	12
WM2II-4_13	Unrestricted	Body acanalado	1	1	0	1
WM2II-4_13	Unrestricted	Body incised	1	0	1	1
WM2II-4_13	Unrestricted	Body with appliqué	1	0	1	1
WM2II-4_13	Unrestricted	Rim/Neck	3	2	1	3
WM2IIB-2_23	Restricted	Body	1	0	1	1
WM2IIB-2_23	Unrestricted	Body	2	0	2	2
WM2IIB-2_25	NI	Body	1	0	1	1
WM2IIB-2_25	Unrestricted	Body	1	0	1	1
WM2IIB-2_25	Unrestricted	Rim	1	1	0	1
WM2IIB-4_9	NI	Body	3	1	2	1
WM2IIB-4_9	Unrestricted	Body	1	1	0	1
WM2IIC-4_10	Unrestricted	Body	0	0	0	0
WM2IID-2_24	Restricted	Body	1	0	1	1
WM2IID-2_24	Unrestricted	Body	1	1	0	1
WM2IID-4_11	Restricted	Body	1	1	0	0
WM2IID-4_11	Unrestricted	Body	2	1	1	1
WM2IID-4_11	Unrestricted	Rim/Neck	1	0	1	1
WM2III-2_16	Unrestricted	Body	1	0	1	1
WM2III-2_17	Restricted	Neck	1	0	1	1
WM2III-2_17	Unrestricted	Body	2	0	2	0
WM2III-3_14	Restricted	Body	3	0	3	1
WM2III-3_14	Restricted	Neck	2	0	2	2
WM2III-3_14	NI	Base	3	0	3	1
WM2III-3_14	NI	Body	18	6	12	4
WM2III-3_14	Unrestricted	Base	2	0	2	2
WM2III-3_14	Unrestricted	Body	33	11	22	0
WM2III-3_14	Unrestricted	Rim	1	1	0	1
WM2III-3_14	Unrestricted	Rim/Neck	7	2	5	7

Bag_Number	Shape_Type	Vessel_Part	Quantity	<Average	>Average	Sampled
WM2II-IV-2_27	Unrestricted	Body	1	0	1	1
WM2II-IV-2_28	Unrestricted	Base	1	0	1	1
ZAR1I1_3	Restricted	Body	7	1	6	6
ZAR1I1_3	NI	Body	5	3	2	2
ZAR1I1_3	Unrestricted	Body	3	3	0	2
ZAR1II2_10	Restricted	Body	13	4	9	9
ZAR1II2_10	NI	Body	3	0	3	1
ZAR1II2_7	Clay ball	NA	1	0	1	1
ZAR1II2_9	Restricted	Body	76	55	21	26
ZAR1II2_9	NI	Base	1	0	1	1
ZAR1II2_9	NI	NI	2	2	0	0
ZAR1II2_9	NI	Rim	3	3	0	0
ZAR1II2_9	NI	Rim/Neck	1	1	0	0
ZAR1II2_9	Unrestricted	Base	1	1	0	1
ZAR1II2_9	Unrestricted	Body	70	44	26	30
ZAR1II2_9	Unrestricted	Rim/Neck	1	0	1	0
ZAR1II3_11	Restricted	Body	14	6	8	8
ZAR1II3_11	Unrestricted	Body	21	12	9	9
ZAR1II3_13	Restricted	Body	25	17	8	8
ZAR1II3_13	NI	Body	4	4	0	0
ZAR1II3_13	Unrestricted	Body	12	5	7	4
ZAR1III4_22	Unrestricted	Body	1	0	1	1
ZAR2I2_14	NI	Rim	1	0	1	1
ZAR2I2_14	Unrestricted	Body	2	2	0	2
ZAR2II2_18	Unrestricted	Body	1	0	1	1
ZAR3I2_21	Restricted	Body	1	0	1	1
ZAR4I2_25	Restricted	Body	6	4	2	3
ZAR4I2_25	Restricted	Shoulder	1	0	1	1
ZAR4I2_25	NI	Body	7	6	1	1
ZAR4I2_25	Unrestricted	Base	1	0	1	1
ZAR4I2_25	Unrestricted	Body	15	13	2	0
ZAR4III3_28	Restricted	Body	1	0	1	1
ZAR4III3_28	Unrestricted	Body	11	5	6	5
ZAR5F14-5_VASIJA	Restricted	Complete Vessel	1	0	1	1
ZAR5I2_43	NI	Body	3	3	0	3
ZAR5II3_41	Restricted	Body	4	2	2	3
ZAR5II3_41	NI	NI	5	5	0	0
ZAR5II3_41	Unrestricted	Body	5	2	3	3
ZAR5II3_41	Unrestricted	Rim/Neck	1	0	1	1
ZAR5II4_33	Restricted	Body	8	6	2	2
ZAR5II4_33	Restricted	Rim/Neck	3	1	2	3
ZAR5II4_33	Restricted	Shoulder/Neck	3	1	2	3
ZAR5II4_33	NI	Body	7	7	0	0
ZAR5II4_33	NI	Rim	1	1	0	0
ZAR5II4_33	Unrestricted	Base	3	2	1	2
ZAR5II4_33	Unrestricted	Body	71	30	41	21
ZAR5II4_33	Unrestricted	Rim	1	1	0	0
ZAR5II4_33	Unrestricted	Rim/Neck	2	1	1	1
ZAR5II4_38	Restricted	Body	1	1	0	1
ZAR5II4_38	Restricted	Body excavated	1	1	0	1
ZAR5II4_38	Restricted	Shoulder	1	0	1	1
ZAR5II4_38	Unrestricted	Body	4	1	3	1
ZAR5II5_36	Restricted	Body	1	1	0	1
ZAR5II5_36	Unrestricted	Body	8	5	3	4
Totals			30891	19623	11270	11468

Appendix 7

Aguas Buenas site description

The *Central Area* of the site was designed as a quadrangular plaza surrounded by mounds forming two rectangular formations. The area is characterized, having similar measurements to a football court, as the social center of the site, possibly used for periodic gatherings. Even though the width of its two accesses is suitable for large quantities of people (ca. 20 m each), their spatial placement—blocked by the *Transitional Ring* and in disconnection to the *Empty Area*—suggest a restrictive nature, to a certain degree.

The *Outer Arches* of the site consist of four concentric mound arrangements built following an elliptical-shoe horse design, which is the most characteristic shape of AB. Mounds within this section are very homogeneous in their formal traits. Four out of the five mounds excavated by PACEN previous to this research (Geurds & van Broekhoven 2012; Geurds 2013a; 2014) belong to this area of the site. The consistency in mound construction practices, relative scarcity of archaeological finds, and the presence of some deposits suggest periodic and short human presence (Auziņa 2018, 98). The arrangement of the *Outer Arches* implies intentions that are twofold. On the one hand, the mound configuration restricts access to the site through the West, a section that lacks an immediate natural boundary, exactly at its geometrical center. On the other hand, the mound concentric disposition channels pedestrian circulation through the site, if we think of the areas between mounds as walkable surfaces surrounded by mounds.

The *Transitional Ring* combines two mound configurations. The first one corresponds with three additional arches, which could be a continuation of the *Outer Arches*. The second one is comprised of five circular mound clusters of larger proportions. This combination implies a transformation in the building process, from a circular to a cluster planning (Auziņa 2018, 133). Additionally, the mound clusters are larger in size when compared to the arch mounds, and feature more surface finds. Also, during excavations at Mound 301, burnt clay was identified (Vlaskamp 2014, 68).

The *Eastern Cluster* is a concentration of approximately 35 mounds located in the easternmost corner of the site, right by the cliff at the foot of La Garnacha stream. It shows no geometrical patterning and surface materials are more abundant than throughout the rest of the site. Structures are highly variable in shape and sizes (Auziņa 2018, 104), and both oval and rectangular morphologies are found, which are unique to this section of AB. These particularities led A. Geurds (pers. comm. 2014) to hypothesize later domestic practices, and these observations were partially confirmed by Auzina's analysis, which characterizes this area of the site as the result of organic development in contrast to the planned endeavour showed in the *Central Area* and the *Outer Arches*, for example (Auziņa 2018, 108).

The *High Cluster* is situated at the southeasternmost part of the site and is the only section that instead of seemingly follow a geometric plan, adapts to the landscape features, which are characterized by the highest elevations within AB. However, it is important to note that, overall, the *High Cluster* is very similar in size, shape, and orientation to a mound group located at Lázaro Villegas, situated 150 m to the south west and on flat terrain. Therefore, its adaptation to the topography (Auziņa 2018, 109) should be re-evaluated. Apart from that, the *High Cluster* is characterized by the presence of surface materials in the flat area surrounded by mounds, as well as several petroglyphs carved on bedrock outcrops (Vlaskamp 2012; Auziņa 2018, 110). According to Auzina (2018, 109), the proximity to

the water stream suggests strategic placement, and its combination with its location at the highest point of the site implies a potentially connected to visibility of the rest of the mound configurations as well as the open areas.

The *Empty Area* is a 3 ha flat open sector with hardly any mounds located between the *Central Area*, the *Transitional Ring*, and the *Eastern Cluster* (Auziņa 2018, 111). There are only eight mounds within this section of the site, including Mound 272, the highest (4.11 m) of Aguas Buenas, and within the four highest mounds throughout the whole research area of this project. The position of this mound could be spatially related to the *Central Area*, while the rest of the structures seem to follow a slightly rectangular configuration. Also, the two mounds north of Mound 272 could actually be part of the *Transitional Ring*, since they could correspond with one of arches within that configuration. Even though Auzina (2018, 111) did not identify a spatial logic to the arrangement of these mounds, the eastern structures seem to delimit one of the entries of the site to the north (see below), while they could also channel pedestrian circulation between the *Eastern Cluster* and the *Central Area*. Even though it is possible that mounds from the empty area belonged to other configurations within the site (Auziņa 2018, 111) and therefore to other construction events, the low densities of material culture suggest practices not related to the *Eastern Cluster*, but more to the planned part of the site.

Regarding accessibility, three different entries to the site have been identified. The first one, briefly mentioned above, consists of a pathway 35 to 45 m wide located west of the site and cutting through the *Outer Arches* almost exactly in half, and then interrupted by the *Transitional Ring* (Auziņa 2018, 94). The second access, with more restrictive characteristics, is found at the north of the site, not only cutting across the *Outer Arches* but also the *Transitional Ring*. The only entry that has direct connection with the *Central Area* is located to the East of the site, and links AB with La Garnacha stream. Additionally, AB features individual rock carvings and petroglyph ensambles, connected not only to bedrock outcrops but also possibly used as landmarks signaling access to La Garnacha stream through the *Eastern* and *High Clusters* (Auziņa 2018, 114).

Appendix 8

Alberto Obando ceramic analysis

A Macrofabric

MF Group	Texture	Feldspars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Organic	Frequency	Sorting	Roundness	Shape	Orientation	Void shape	Void orient	Core-margin	Hardness	Fracture	Feel	Induction1 (grs)	Induction2 (grs)	Induction3 (grs)	Induction4 (grs)
AO1.A	Coarse - Medium	1	1	1	0	0	1	0	0	0	5-10%	MS	LS	Subangular/ Subrounded	Concentric/Chaotic	Oval-sphere	Concentric	8-10	S	Fine/Irregular	Rough	96	70	389	67,4
AO1.B	Coarse	1	1	1	0	0	1	0	1	0	30%	MS	LS	Subangular/ Rounded	Concentric	Oval-sphere	Chaotic	2-8-10	H	Irregular	Powdery	238,58	71,6	72,9	35,3
AO1.C	Very coarse	1	1	1	0	1	1	0	1	0	30%	PS	LS	Subangular/ Subrounded	Parallel/Oblique/ Concentric/Chaotic	Plate	Parallel/Oblique	8	S	Smooth/Fine	Powdery	59,3	86,1	128,3	119,3
AO1.D	Coarse - Medium	1	1	1	0	0	1	1	1	0	20%	MS	LS	Subangular/ Subrounded	Concentric/Chaotic	Plate	Parallel	8-10	H	Irregular	Powdery	0	4,6	40,1	48,7
AO1.E	Medium	1	1	1	0	0	1	0	1	0	15-20%	WS	HS/LS	Subrounded	Subparallel/Chaotic	Plate/Oval-sphere	Chaotic	1-9	H	Irregular	Chaotic	0	0	35,6	0
AO.F	Coarse	1	1	1	0	0	1	1	1	0	20%	MS	HS/LS	Subangular/ Subrounded	Concentric/Chaotic	N/A	N/A	4-10	S	Irregular	Rough	0	0	0	16,9
Outliers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	5,9	23,7

B Macrotrace (petro)

MF group	Sherd code	Strati-graphy	Vessel part	Shape	(cm)	Wall thickness (mm)	Macro-assessment	Petro Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equi-distant	Position	Pre-forming	Grain position	Striations	Finishing	Surface treatment	Firing T	Context	Proposed use	Comments
AO1.B 2(2)	AO1.11 .S1	AO1IV4	Body	CC?	N/A	5,5		1A	Coarse	1,5	N/A	N/A	Yes	Oblique (i-o)	Pinching, drawing	Outside/ Inside	Yes	WC (ext), LHC (shaving, int)	Red slip inside	<750 C	Horizon C	Cooking	External surface eroded, possible fire marks?
AO1.B 1(3)	AO1.5. S1	AO1III3	Body	CR	25	5,5		1A	Coarse	2,5	N/A	N/A	Yes	Oblique (i-o)	Pinching, drawing	Outside/ Inside	Yes	LHC (shaving, ext), WC (int)	Red slip outside	<750 C	core layer	Serving/storage (liquids)	Cilindrical vessel, interior eroded (looks like fermentation), parallel striations outside that look like from LHC finishing, not surface treatment BUT it could be WC scraping followed by LHC smoothing with soft tool
AO1.C 4	AO1.6. 1	AO1III3	Rim	CR	17	4		2	Very coarse	0.5-1	>body	Inside	N/A	Alternate	Pinching, drawing (less than in other samples, coils are super rounded)	Outside/ Inside	Yes	WC, fingers or tool	N/A	<750 C	core layer	Cooking/storage	Slightly eroded surfaces, but unlike the previous two samples, it combines the SAME striations but with prominent grains... WC finishing + LHC surface treatment in the rest? meaning, instead of shaving is scraping?
AO1.D 3(2)	AO1.6. 5	AO1III3	Rim	CCC	24	5		1A	Coarse - Medium	0.5-1.2	>body	Outside	Yes	Oblique (o-i)	Pinching, drawing	Outside/ Inside	Yes	WC (scraping or fingers, int)	LHC smoothing, red slip both surfaces, burnished	<750 C	core layer	Serving	Mineral rich slip, shines without burnishing
AO1.B 3(1)	AO1.6. S2	AO1III3	Body	CRD?	N/A	5,5		1	Coarse	1,3	N/A	N/A	Yes	Oblique (i-o)	Pinching, drawing	Outside	Yes	WC (scraping or fingers)	Red barbotine outside, possible burnishing both sides (more intense inside)	<750 C	core layer	Serving	Should be in group B1. This sample confirms WC finishing, lack of surface treatment
AO1.A 3(1)	AO1.56 .1	AO1IV5	Rim	CRD?	N/A	7		1	Coarse - Medium	1,5	N/A	Inside	N/A	Oblique (i-o)	Pinching, drawing	Outside/ Inside	Yes	WC (scraping or fingers)	LHC smoothing + red slip (int), barbotine of same clay (ext), burnishing ? (ext)	<750 C	Horizon C	N/A	Should be in group A1, coil size is of the lip coil
AO1.C 3(2)	AO1.6. 6	AO1III3	Rim	CC	25	4		1A	Very coarse	1	>body	Inside	N/A	Oblique (i-o)	Pinching, drawing	Inside	Yes	LHC (shaving) fingers or tool rehydrated	Red slip, burnished	<750 C	core layer	Serving	Should be in group C2, this one does look like LHC work... there are some grains protuberant but it is not clear... Incisions parallel to the rim (below it), two lines
AO1.A 3(1)	AO1.5. S2	AO1III3	Base	CRD	15	4		1	Coarse - Medium	N/A	N/A	N/A	N/A	Oblique (o-i)	Pinching, drawing	Inside	Yes	LHC (shaving) fingers or tool rehydrated	Red slip burnished both sides	<750 C	core layer	Serving	Base plus a bit of the body, diameter is of the base,

MF group	Sherd code	Stratigraphy	Vessel part	Shape	(cm)	Wall thickness (mm)	Macro-assessment	Petro Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equidistant	Position	Pre-forming	Grain position	Striations	Finishing	Surface treatment	Firing T	Context	Proposed use	Comments
AO1.A 3(3)	AO1.6.2	AO1III3	Rim	CC	16	5		1	Coarse - Medium	1	body	Inside	Yes	Oblique (o-i)	Pinching, drawing	Inside	Yes	LHC (shaving) fingers or tool rehydrated	Red slip, both sides, burnished outside (not confirmed inside)	<750 C	core layer	Serving	
AO1.F 4	AO1.6.4	AO1III3	Rim	P	30	3,5		3	Coarse	1,7	N/A	Outside	N/A	N/A	Pinching, drawing	Outside/ Inside	Yes	WC (scraping or fingers)	LHC smoothing	<750 C	core layer	N/A	Lip coil was measured
AO1.A 3(4)	AO1.6.11	AO1III3	Rim	CRD	20	5		1	Coarse - Medium	1	>body	Inside	N/A	Oblique (o-i)	Pinching, drawing	Inside	No	N/I	LHC smoothing, red slip, burnished both sides. Hard to tell finshing, later traces erased previous ones	<750 C	core layer	N/A	Only sample so far without striations!!!
AO1.C 3(2)	AO1.5.4	AO1III3	Rim	CRD	20	5,5		1A	Very coarse	1,5	N/A	Inside	N/A	N/A	Pinching, drawing	Outside/ Inside	Yes	WC (scraping or fingers)	LHC smoothing, Red/White slip inside burnished, smoked outside	<750 C	core layer	Serving	
AO1.A 1	AO1.11.1	AO1IV4	Rim	CRD	40	5		1B	Coarse - Medium	1,5	N/A	Outside	N/A	N/A	Pinching, drawing	Outside/ Inside	Yes	WC (scraping or fingers)	LHC smoothing, barbotine+ brownslip	<750 C	Horizon C	N/A	Lip coil was measured
AO1.C 1	AO1.5.3	AO1III3	Rim	CRD	20	5		1B	Very coarse	1,4	N/A	Inside	N/A	Oblique (i-o)	Pinching, drawing	Inside	Yes	N/I	LHC smoothing	<750 C	core layer	N/A	Should be in C4, no coating. Possibly WC traces deleted by LHC after work
AO1.A 4(1)	AO1.6.13	AO1III3	Rim	P	22	3,5		Outlier	Coarse - Medium	1-1.2	N/A	Outside	N/A	Oblique (o-i)	Pinching, drawing	Outside	Yes	N/A	N/A	?	core layer	N/A	Eroded
AO1.A 3(1)	AO1.5.12	AO1III3	Rim	CRD	15	5		1	Coarse - Medium	0,9	body	N/A	N/A	N/A	Pinching, drawing	Inside	Yes	WC (scraping or fingers)	LHC smoothing, smoked+polished, redslip+polished	<750 C	core layer	Serving	Fragmented
AO1.A 3(3)	AO1.5.2(2)	AO1III3	Rim	CRD	20	3		2	Coarse - Medium	0,5	body	Inside	Yes	Alternate	Pinching, drawing	Outside/ Inside	Yes	WC (scraping or fingers)	LHC smoothing, red slip+polished	<750 C	core layer	Serving	Re-drawn, it is not in the drawings

MF group	Sherd code	Stratigraphy	Vessel part	Shape	(cm)	Wall thickness (mm)	Macro-assessment	Petro Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equidistant	Position	Pre-forming	Grain position	Striations	Finishing	Surface treatment	Firing T	Context	Proposed use	Comments
AO1.B 3(1)	AO1.5.14	AO1III3	Rim	N/A	25	3,5		1	Coarse	1,2	N/A	Outside	N/A	N/A	Pinching, drawing	Outside/ Inside	Yes	WC (scraping or fingers)	LHC smoothing, red/Orange slip+polished	<750 C	core layer	Serving	AO1.5.2 in the drawings (watch out!), lip coil measured
AO1.C 4	AO1.6.3	AO1III3	Rim	CRD	13	4		2	Very coarse	0.8-1.1	N/A	Outside	N/A	N/A	N/A	Outside/ Inside	Yes	WC (scraping or fingers)	LHC smoothing	<750 C	core layer	N/A	Too fragmented
AO1.A 2	AO1.6.12	AO1III3	Rim	CR	25	5,5		3	Coarse - Medium	N/A	N/A	N/A	N/A	N/A	N/A	Outside	YES	WC (scraping or fingers)	Red slip inside, iron rich (shiny but does not look polished)	<750 C	core layer	N/A	Too fragmented
AO1.B 3(3)	AO1.6.7	AO1III3	Rim	CRD	40	5		1	Coarse	1,5	N/A	Outside	Yes	Alternate	Pinching, drawing	Inside	No	N/I	LHC smoothing, Brown slip polished both sides	<750 C	core layer	Serving	Too fragmented
AO1.B 2(1)	AO1.6.9	AO1III3	Rim	CR	17	4		1A	Coarse	1.3-1.5	body	Outside	N/A	N/A	Pinching, drawing	Outside/ Inside	YES	WC (scraping or fingers)	LHC smoothing, red slip	<750 C	core layer	Serving	Too fragmented, lots of sub-parallel voids in the cross section, maybe a bit of percussion?
AO1.A 3(2)	AO1.56.1	AO1IV5	Rim	CCo	30	5		1	Coarse - Medium	1.3-1.5	body	Outside	N/A	Oblique (o-i)	Pinching, drawing	Outside/ Inside	Yes	WC (scraping or fingers)	LHC smoothing, red slip	<750 C	Horizon C	Serving	
Guegu estepe		Ethnographic sample	Rim	CML	25	3	Unworked clay	Guegu estepe	Fine	N/A	N/A	N/A	N/A	Inserted	Clay mass, percussion on passive convex support divided with fabric	Inside	Fabric	LHC, rock	Burnishing			Cooking/Serving	

C Rims

Rim Code	U/R	Shape	Wall ∠ (°)	Base ∠ (°)	(cm)	%	Wall (mm)	Rim profile	Rim ∠ (°)	Lip morphology	Comments
A01IV4.11(1)	U	P	50		40	3	5	Everted	10	Round	
A01IV4.11(2)	U	CR	80		20	2	5	Direct	80	Thinned	
A01IV4.11(3)	R	CR	100		15	4	4,5	Inward	130	Thickened outside	
A01IV4.11(4)	R	CCo	110		33	2	4,5	Direct	110	Thickened outside	
A01IV4.11(5)	U	CRD	75		20	3	5	Direct	75	Round	
A01III3.6(1)	U	CR	90		17	10	4	Excurvated	40	Round	
A01III3.6(2)	U	CC	50		16	4	4	Direct	65	Round	
A01III3.6(3)	U	CRD	75		13	9	4	Direct	75	Thickened & beveled inside	
A01III3.6(4)	U	P	40		30	3	3,5	Everted	10	Thickened inside	
A01III3.6(5)	R	CCC	120		21	4	5	Incurved	140	Thickened, flat	
A01III3.6(6)	R	CC	70		25	3	4	Direct	110	Beveled inside	
A01III3.6(7)	U	CRD	40		40	2	5	Direct	40	Flat	
A01III3.6(8)	U	CRD	40		24	5	5	Direct	40	Flat	
A01III3.6(9)	R	CR	85		17	6	4	Inward	110	Thickened outside	
A01III3.6(10)	R	CR	85		25	3	4	Inward	110	Thickened outside & flat	
A01III3.6(11)	U	CRD	75		20	5	5	Everted	30	Thinned	
A01III3.6(12)	U	CR	75		25	3	5,5	Direct	75	Flat	
A01III3.6(13)	U	P	30		22	3	3,5	Direct	30	Thickened	
A01III3.6(14)	U	CRD	65		18	3	4	Everted	30	Thickened	
A01III3.6(15)	R	CCC	145		15	2	5	Incurved	175	Slightly flat	
A01III3.6(16)	U	CR	90		30	2	6	Direct	90	Slightly flat	
A01III3.6(17)	U	CR	85		17	3	5	Direct	85	Thickened	
A01III3.6(18)	R	CR	80		20	2	5	Incurved	110	Thickened & flat	
A01III3.6(19)	R	CCC	120		4	13	4	Incurved	120	Thickened	
A01III3.6(20)	U	CRD	70		15	3	4	Direct	70	Flat	
A01III3.6(21)	U	CR	90		13	4	4	Direct	90	Thickened & slightly flat	
A01III3.6(22)	U	CR	90		20	2	5	Direct	90	Slightly flat	
A01III3.6(23)	U	CRD	50		18	3	5	Direct	50	Flat	
A01III3.5(1)	U	CRD?	60		25	6	5	Outflaring straight	60	Thickened inside & Beveled outside	
A01III3.5(2)	N/A	CR/O?	110		25	4	3,5	Excurvated	90	Thickened & beveled inside	
A01III3.5(2)2	U	CRD	80		20	3	5	Direct	80	Everted inside	
A01III3.5(3)	U	CRD	75		20	3	5	Direct	75	Beveled inside	
A01III3.5(4)	U	CRD	75		20	3	5	Incurved	110	Thickened & beveled outside	
A01III3.5(5)	U	CR	90		30	3	5	Direct	90	Round	
A01III3.5(7)	U	P	5		6,5	10	3,5	Direct	5	Round	
A01III3.5(6)	U	CC	70		10	10	5	Direct	110	Thickened & beveled outside	
A01III3.5(8)	R	CCC	140		20	4	5	Incurved	150	Round	
A01III3.5(9)	R	CCC	60		13	5	3	Incurved	110	Round	
A01III3.5(10)	U	CR	80		18	5	4	Direct	80	Beveled outside	
A01III3.5(11)	U	CRD	70		20	3	4	Direct	70	Round	
A01III3.5(12)	U	CRD	60		15	6	5	Direct	60	Round	
A01III3.5(13)	U	CC	70		10	10	3	Direct	90	Thickened	
A01IV5.56(1)	R	CCo	100		30	2	5	Direct	110	Flat	
A01IV5.56(2)	U	CRD	70		23	3	7	Direct	70	Round	
A01IV5.56(3)	U	CRD	30		25	2	6,5	Direct	30	Round	

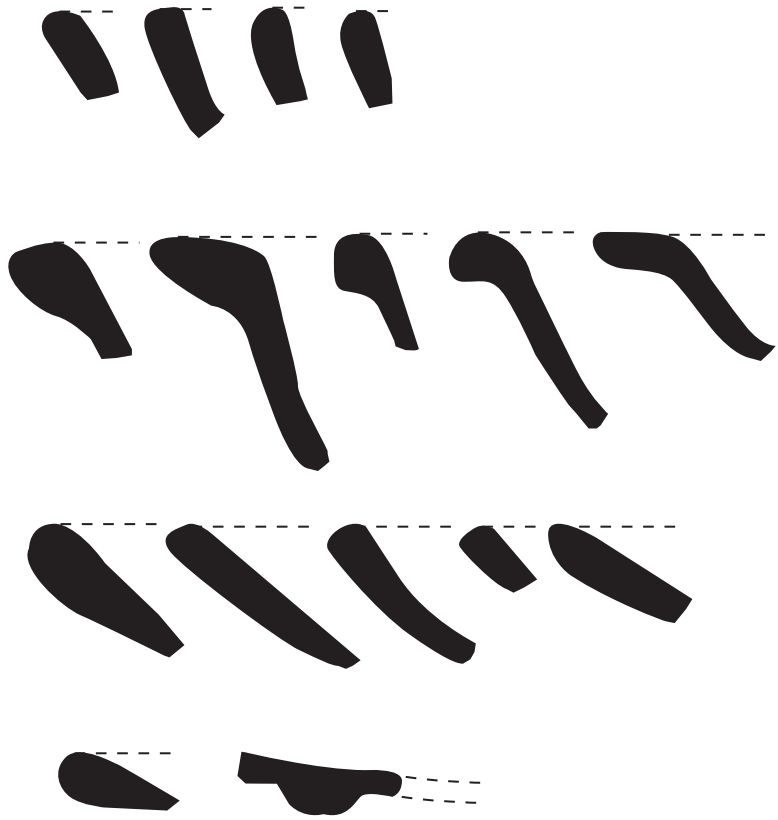
D Decoration & Appendages

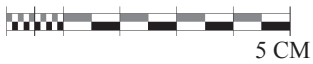
MF Group	Sample Code	Part	Incision	Punctuation	Applique	Zoomorphic	Anthropomorphic	Paint	Double slip	Acanaladura	Impression	Comments
AO1.A3	AO1.56	Rim?	0	0	0	0	0	0	1	0	0	Red/white, Eroded sherd, it seems that double slip is on external surface
AO1.A1	AO1.5	Body	0	0	1	0	0	0	0	0	0	External surface: red slip + applied thin coil (3.5 mm wide), parallel to vessel base
AO1.A1	AO1.6.19	Rim	0	0	0	0	0	0	1	0	0	Red/white
AO1.A3	AO1.6	Body	0	0	0	0	0	0	1	1	0	External wall, red/white, acanaladura apparently parallel to base
AO1.A3	AO1.6	Body	0	0	0	0	0	0	1	0	0	brown/barbotine, intrnal wall
AO1.A3	AO1.5	Body	1	0	0	0	0	0	0	0	0	Two thin lines (<0.5mm) on external surface, soot outside
AO1.A3	AO1.6.21	Rim	0	0	0		0	0	1	0	0	Red/white, int surface
AO1.A3	AO1.6	body	0	0	0	0	0	0	1	0	0	Orange/White, external surface
AO1.A3	AO1.6	body	0	0	0	0	0	0	1	0	0	Red/orange
AO1.A3	AO1.6	body	0	0	0	0	0	0	1	0	0	Brown/red
AO1.A3	AO1.6.20	Rim	0	0	0	0	0	0	1	0	0	Red/orange
AO1.A3	AO1.5.6	Rim	0	0	1	0	0	0	0	0	0	Thin CCC (looks like a tecomate?) with handle or lug scar 37x17mm
AO1.A3	AO1.11	body or base	0	0	1	0	0	0	0	0	0	9mm wide coil applid to the external wall, seems body, not base, but not sure
AO1.A3	AO1.5.9	body	0	0	0	0	0	0	1	0	0	Red/white
AO1.A4	AO1.6	body	1	0	0	0	0	0	0	0	0	At least 3 parallel thin lines (<1mm), parallel to the base, appears they were done in LHC, EXCISDE?
AO1.A4	AO1.6	handle	0	0	1	0	0	0	0	0	0	Cyllindrical handle (13 mm diam)
AO1.B3	AO1.5.14	Rim	0	0	0	0	0	0	1	0	0	Red/orange, internal surface, apparently only orange on the external
AO1.B1	AO1.5	Body	0	0	0	0	0	0	1	0	0	Red/orange, external surf
AO1.B1	AO1.11	Body	0	0	0	0	0	0	1	0	0	Red/orange, external surf
AO1.B3	AO1.6	Base+support	0	0	1	0	0	0	0	0	0	Mammiform support (25mm diam, with one orifice of 4mm diam)
AO1.C3	AO1.?4	Base	0	0	0	0	0	0	1	0	0	Red/white, internal surface
AO1.C3	AO1.6.6	Rim	1	0	0	0	0	0	0	0	0	Two parallel thin lines (<0.5mm) on external surface parallel to the rim, inside red slip, they look done in LHC
AO1.C4	AO1.11	handle	0	0	1	0	0	0	0	0	0	19x13mm with traces of reinforcements, curved
AO1.C4	AO1.?	Support	0	0	1	0	0	0	0	0	0	mammiform support (21mm diam, no orifice), shallow
AO1.C1	AO1.6	Lug	0	0	1	0	0	0	0	0	0	lug with oval base and sort of conical tip
AO1.C3	AO1.6	body	0	0	0	0	0	0	1	0	0	external surface, orange slip, internal surface red/orange
AO1.C3	AO1.5	Rim	0	0	0	0	0	0	1	0	0	red/orange, internal surface
AO1.C3	AO1.5	Body	0	0	0	0	0	0	1	0	0	Red/white
AO1.C2	AO1.6	Body	0	0	0	0	0	0	1	0	0	Orange/white on internal surface
AO1.C2	AO1.6.S1	Base+support	0	0	1	0	0	0	1	0	0	red/orange/white, internal surface, Mammiform support (28mm diam, with one orifice of 6mm diam)
AO1.D3	AO1.6.5	Rim	0	0	0	0	0	0	1	0	0	red/white
AO1.D3	AO1.11	Rim	0	0	0	0	0	0	1	0	0	red/white, internal surface
AO1.D3	AO1.6	Body	0	0	0	0	0	0	1	0	0	red/orange, external surface
AO1.D3	AO1.6	Rim	1	0	0	0	0	0	0	0	0	one thin (<0.5mm) line parallel to the rim
AO1.D2	AO1.56	body	0	0	0	0	0	0	1	0	0	orange/white, INTERNAL surface
Outlier	AO1.6	Rim+lug	0	0	1	0	0	0	0	0	0	zoomorphic lug (duck?) with orangy red slip
Totals			**4**	**0**	**10**	**0**	**0**	**0**	**23**	**1**	**0**	

AO1

5 CM

AO1





Appendix 9

Aguas Buenas ceramic analysis

A Macrofabric

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Or-ganic	Fre-quency	Sorting	Round-ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Frac-ture	Feel	Induc-tion1 (gr)	Induc-tion2 (gr)	Induc-tion3 (gr)	Induc-tion4 (gr)
AB2.A	Granule - Coarse	1	1	1	1	0	1	1	1	0	20- >30%	PS	HS/LS	Subangular/Subrounded	Subparallel/Concentric/Chaotic	Plate/Oval-sphere	Subparallel	8-10	H	Irregular	Smooth	486	61,4	102	115
AB2.B	Very coarse - Medium	1	1	1	0	1	1	0	1	0	25%	MS	LS	Subangular/Subrounded	Subparallel/Concentric/Chaotic	Plate/Oval-sphere/Irregular	Oblique/Chaotic	2-4-10	H	Irregular	Smooth	179	8,5	45,7	75,6
AB2.C	Coarse - Fine	1	0	1	1	1	1	0	1	0	20-25%	MS	LS	Subangular/Subrounded	Concentric/Chaotic	Plate/Oval-sphere/Irregular	Subparallel/Oblique/Chaotic	4-8-10	H	Irregular	Smooth	62	0	42,4	131
AB2.D	Coarse - Fine	1	1	1	0	1	1	0	1	0	20%	MS	LS	Subangular/Subrounded	Oblique/Chaotic	Plate/Oval-sphere/Irregular	Oblique	4-8-10	H	Smooth/Irregular	Rough/Smooth	250	9,9	111	165
AB2.E	Coarse - Fine	1	1	1	1	0	1	0	1	0	20-25%	PS	LS	Subangular/Subrounded	Oblique/Chaotic	Plate	Oblique/Concentric	2-8-10	H/VH	Irregular	Smooth	45,8	21,1	136	76,9
AB2.F	Fine - Very fine	1	0	1	1	1	1	0	1	0	10-15%	WS	LS	Subangular/Subrounded	Subparallel/Chaotic	Plate	Parallel	1-3	H/VH	Subconchoidal/Smooth/Irregular	Smooth/Powdery	25,7	16,1	62,7	11,3
AB2.G	Coarse - Medium	1	1	1	0	1	0	0	1	0	20-25%	WS	LS	Subangular/Subrounded/Rounded	Concentric/Chaotic	Oval-sphere/Irregular	Chaotic	2-10-14	H	Subconchoidal/Smooth	Rough	96,4	0	0	8,3
AB2.H	Coarse - Medium	1	1	1	1	1	1	0	1	0	20-25%	MS	LS	Subangular/Subrounded	Oblique/Chaotic	Plate/Oval-sphere	Chaotic	2-4-10	H	Subconchoidal/Irregular	Smooth	249	60,8	103	266
AB2.I	Very coarse - Medium	1	0	1	0	1	1	0	1	0	20-25%	MS	LS	Subangular/Subrounded	Chaotic	Plate/Oval-sphere/Irregular	Chaotic	2-6-10	H	Smooth/Fine	Rough/Powdery	101	0	119	110
AB2.L	Very coarse - Medium	1	1	1	1	1	1	0	1	0	20-25%%	PS	LS	Angular/Subangular/Subrounded	Oblique/Chaotic	Plate/Irregular	Subparallel/Concentric/Chaotic	2-8-10	S/H	Subconchoidal/Irregular	Rough/Powdery	159	21,5	188	160
AB3.A	Medium	1	0	0		1	1	0	0	0	10-15%	WS	LS	Angular/Subrounded	Subparallel/Concentric	Plate/Oval-sphere/Irregular	Oblique	1-3-15	S	Fine	Smooth	20,7	0	115	72,4
AB3.B	Medium - Fine	1	1	0		1	1	1	0	0	15-20%	MS	LS	Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate/Irregular	Subparallel/Concentric	2-4-8-10	S	Fine/Irregular	Smooth/Powdery	25,1	16,7	67,5	16
AB3.C	Coarse - Medium	1	1	1		1	1	0	0	0	20-25%	MS	LS	Subangular/Subrounded/Rounded	Subparallel/Oblique/Concentric/Chaotic	Plate/Oval-sphere/Irregular	Subparallel/Concentric/Chaotic	2-4-10	S	Fine/Irregular	Rough/Powdery	67,9	3,6	215	36,3

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Or-ganic	Fre-quency	Sorting	Round-ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Frac-ture	Feel	Induc-tion1 (gr)	Induc-tion2 (gr)	Induc-tion3 (gr)	Induc-tion4 (gr)
AB3.D	Medium - Fine	1	0	0		1	1	0	0	1	10-15%	WS	LS	Subangular	Chaotic	N/A	N/A	1-9	S	Fine	Smooth	22,4	0	10,8	3,8
AB3.E	Coarse - Medium	1	1	0		1	1	0	1	0	15-20%%	MS	LS	Subangular/Subrounded	Oblique/Concentric	N/A	N/A	2-8	H	Irregular	N/A	0	0	2,4	10
									0	0															
AB4.A	Coarse - Medium	1	1	0		1	1	0	1	0	30%	MS	LS	Subangular/Subrounded	Chaotic	Plate/Irregular	Parallel/Subparallel	4-14	H	Irregular	Rough	0	0	0	37,5
AB4.B	Coarse - Fine	1	0	1		1	1	0	1	0	20%	MS	LS	Subrounded	Chaotic	Plate/Irregular	Chaotic	14	H	Smooth/Fine	Smooth	0	13,2	0	59,2
AB4.C	Coarse - Medium	1	0	1		1	0	0	1	0	15-20%	MS	LS	Subangular	Chaotic	Plate	Subparallel/Oblique/Concentric	2-4	H	Irregular	Rough	0	0	0	42,6
AB4.D	Coarse - Fine	1	0	0			1	0	1	0	15-20%	MS	LS	Angular/Subangular/Subrounded	Concentric/Chaotic	Plate	Subparallel/Concentric	2	H	Fine/Irregular	Rough	0	0	0	83,9
AB4.E	Coarse - Fine	1	0	1		1	0	0	1	0	15%	MS	LS	Subangular/Subrounded	Subparallel/Oblique/Chaotic	Plate/Irregular	Subparallel/Oblique/Chaotic	2-18	H	Irregular/Hackly	Rough	0	0	0	95,2
AB4.F	Coarse - Medium	1	1	0		1	1	0	0	0	20%	MS	LS	Angular/Subangular/Subrounded	Subparallel/Chaotic	N/A	NA	2	S	Irregular	Rough	11	0	0	9
AB4.G	Coarse - Medium	1	0	0		1	1	0	1	0	15%	MS	LS	Angular/Subangular/Subrounded	Chaotic	Irregular	Chaotic	2	H	Smooth	Rough	0	47,3	0	0
AB4.H	Coarse - Medium	1	1	0		1	0	0	1	0	15-20%	MS	LS	Subangular/Subrounded	Chaotic	Oval-sphere/Irregular	Chaotic	2	S/H	Smooth	Rough	27	0	0	0
AB4.I	Coarse - Medium	1	1	0		1	0	0	1	0	20%%	MS	LS	Subangular/Subrounded	Chaotic	Plate/Oval-sphere	Oblique/Chaotic	2	H	Subconchoidal	Rough	0	0	0	16,9
AB4.L	Coarse	1	1	0		1	1	0	0	0	20%	MS	LS	Angular/Subangular/Subrounded	Subparallel/Oblique	Irregular	Chaotic	8	H	Subconchoidal	Rough	2	0	0	7
AB4.OUTLIERS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0	15,2	7,4
AB5.A	Coarse - Medium	1	0	1	0	1	1	0	1	0	20%	WS	LS	Angular/Subangular/Subrounded	Subparallel/Concentric	N/A	N/A	10	S/H	Irregular	Rough	0	0	0	21,6
AB5.OUTLIERS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,3	0	8,3	21

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Or-ganic	Fre-quency	Sorting	Round-ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Frac-ture	Feel	Induc-tion1 (gr)	Induc-tion2 (gr)	Induc-tion3 (gr)	Induc-tion4 (gr)
AB6.A	Very coarse - Medium	1	1	1	0	1	0	0	1	0	20-25%	MS	LS	Subangular/Subrounded	Subparallel/Concentric/Chaotic	Oval-sphere/Irregular	Subparallel/Chaotic	8-10	H	Fine/Irregular	Rough	6,8	0	0	19,3
AB6.B	Very coarse - Fine	1	0	1	0	1	1	0	1	0	15-20%	MS	LS	Subangular/Subrounded	Subparallel/Chaotic	Oval-sphere/Irregular	Chaotic	4-10-14	H	Smooth/Fine	Rough	0	0	0	22,2
AB6.C	Very coarse - Medium	1	1	0	0	1	1	0	1	0	30%	MS	LS	Subangular/Subrounded	Chaotic	Oval-sphere/Irregular	Chaotic	10	S	Irregular	Rough	0	7,3	0	0
AB6.D	Coarse - Medium	1	0	0	1	1	1	0	1	0	20-25%	MS	LS	Angular/Subangular/Subrounded	Chaotic	Plate	Irregular	2-4-10	S	Fine/Irregular	Rough	14,4	0	0	25,3
AB6.E	Coarse - Fine	1	0	0	0	1	1	0	1	0	20%	MS	LS	Angular/Subangular/Subrounded	Concentric/Chaotic	Oval-sphere	Chaotic	4-10	H	Fine	Rough	0	0	0	8,6
AB6.F	Coarse - Fine	1	0	0	0	1	1	0	1	0	20%	MS	LS	Subangular/Subrounded	Concentric/Chaotic	N/A	N/A	10	S	Fine	Rough	0	0	0	4,2
AB6.G	Coarse - Fine	1	0	0	0	1	1	0	1	0	15-20%	MS	LS	Subangular/Subrounded	Chaotic	Plate/Oval-sphere	Chaotic	2	S	Fine	Rough	0	0	0	3,9

B Macrotrace (petro)

MF group	Sherd code	Stratigraphy	Vessel part	Shape	(cm)	Wall thick-ness (mm)	Macro-assess-ment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equi-distant	Position	Pre-forming	Grain position	Striations	Finishing	Surface treatment	Firing T	Context	Propo-sed use	Comments
AB6.F4 (1)	AB6.44.1	AB6II3	Rim	CCC?	N/A	6	Tempered?	7	Coarse - Fine	1	N/A	Outside	N/A	N/A	Pinching, drawing	Outside	NO	WC	N/A			N/A	eroded possibly. Grains outside denote WC finishing, but lack of striations and marks make it difficult to
AB6.A1 (1)	AB6.112.1	AB6II2	Rim	P	20	5	Unprepared	6	Very coarse - Medium	1,6	body	Inside	YES	Oblique (i-o), spiral?	, drawing (maybe on a flat support)	Outside /Inside	YES	WC (scraping or fingers)	WC work on the int surface,			Serving	Striations are like the ones found in AO! White slip applied on protuberant grains, not on LHC smoothed surface!
AB6.C2 (1)	AB6.114.3	AB6II3	Rim	Cco	5	6	Unprepared	7	Very coarse - Medium	1,5	N/A	Inside	N/A	N/A	Pinching, drawing	Outside /Inside	NO	LHC (shaving?)	N/A			N/A	seems LHC work. However, several protuberant grains could indicate and actual WC finishing erased by LHC
AB6.D4 (1)	AB6.174.1	AB6II3	Rim	P	40	5	Tempered?	Outlier	Coarse - Medium	1,7	body	Inside	YES	Oblique (i-o), spiral?	Pinching, drawing	Outside /Inside	YES	WC (scraping or fingers)	LHC smoothing			Serving	AB6II3.114(1). Apparent scraping (AO style, striations plus prominent grains) but LHC smoothing probably
AB6.B4 (1)	AB6.114.2	AB6II3	Rim	U	25	4	Sorting?	1	Very coarse - Fine	1,1	N/A	Inside	N/A	N/A	Pinching, drawing	Outside /Inside	NO	WC (scraping or fingers)	N/A			N/A	Small fragment, hard to assess
AB5.A4 (1)	AB5.173	AB5II2	Body	R	N/A	10	Tempered?	3	Coarse - Medium	1,9	N/A	N/A	N/A	Oblique (i-o)	Pinching, drawing	Outside	YES	WC (scraping or fingers)	N/A			Cooking/Storage	AO style traces, but with UNIQUE trait: circular gesture (fingers or tool?) in the int surf, regular topo
AB4.A4 (3)	AB4.81a	AB4II2	Rim	CRD	10	10	Unprepared	3	Coarse - Medium	1,2	body	Inside	N/A	Alternate	Pinching, drawing	Outside	YES	WC (scraping or fingers)	N/A			Cooking/Storage	AO style traces, maybe here in AB the gestures are a bit more chaotic, less "horizontal, regular topo
AB4.B4 (2)	AB4.81b	AB4II2	Body	U	N/A	8	N/A	1	Coarse - Fine	1,5	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside /Inside	YES	WC (scraping or fingers)	LHC smoothing?			N/A	finishing traces: maybe paddle and anvil? that would explain striations on internal surface only, and also grains outside
AB4.D4 (1)	AB4.81c	AB4II2	Body	R	N/A	7	Tempered?	2	Coarse - Fine	1,3	N/A	N/A	YES	Oblique (o-i)	Pinching, drawing	Outside	YES	WC (scraping or fingers)	Some WC work on ext surf, or				Sherd is characterized by extremely irregular topography (pinching?)
AB4.G2 (1)	AB4.81d	AB4II2	Body	U	N/A	7	Sorting/Sieving/Tempered	4(subgroup)	Coarse - Medium	1,7	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside /Inside	NO	WC (scraping or fingers)	LHC smoothing, red slip			Serving	there is very good fashinong work, surface is regular but coils are distinguishable. good surface treatment inside
AB3.A3 (4)2	AB3.133.5	AB3III3	Rim	CRD	20	3,5	Sorted/Sieved/Tempered	5	Medium	1,3	body	Inside	YES	Oblique (i-o)	Pinching, drawing	Outside /Inside	YES	WC (scraping or fingers)	LHC smoothing, red slip			Serving	the LHC smoothing erases the striations from scraping (ext surf: rim section=clear striations, grains outside;
AB3.A3 (4)1	AB3.133.2	AB3III3	Rim	CCC	15	3,5	Sorted/Sieved/Tempered	1(subgroup)	Medium	1,8	N/A	Outside	N/A	N/A	Pinching, drawing	Outside /Inside	YES	WC (scraping or fingers)	LHC smoothing, red slip			Serving	Clear WC finishing and then LHC st. Only lip coil was measured.

MF group	Sherd code	Stratigraphy	Vessel part	Shape	(cm)	Wall thickness (mm)	Macro-assessment	Petrographic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equidistant	Position	Pre-forming	Grain position	Striations	Finishing	Surface treatment	Firing T	Context	Proposed use	Comments
AB3.A3 (1)	AB3.84.1	AB3II2	Rim	CRD	22	11	Sorted/Sieved/Tempered	Outlier	Medium	1,1	N/A	Outside	N/A	N/A	Pinching, drawing	Outside/Inside	NO	N/A	smoothing, red and brown			N/A	WC (protuberant grains on the ext surf), but it is inconclusive. No clear shaving traces either, GOOD LHC work.
AB3.B3 (1)	AB3.133.8	AB3III3	Rim	CRD	20	3,5	Sieved/sorted	1	Medium - Fine	0,9	N/A	Outside	N/A	N/A	Pinching, drawing	Inside	YES	LHC?	Brown slip			N/A	measured. Striations are similar than in WC finishing, but LHC finish on those ones erase them... so it does seem
AB3.B3 (4)	AB3.90.3	AB3IV4	Rim	CRD	10	10	Sieved/sorted	1	Medium - Fine														
AB3.A3 (2)	AB3.90	AB3IV4	Body	U	N/A	7.5-9	Sorted/Sieved/Tempered	7	Medium	1,7	N/A	N/A	YES	Oblique (o-i)	Pinching, drawing	Inside/ejected	NO	LHC (shaving)	Red slip			Serving	Apparently good example of LHC finishing, comets + tool marks + inserted grains. Compact topography
AB3.A3 (3)	AB3.90.1	AB3IV4	Rim	CRD	20	7	Sorted/Sieved/Tempered	1	Medium	1,6	N/A	Inside	N/A	N/A	Pinching, drawing	Outside/Inside/Ejected	YES	WC (scraping or fingers)	LHC smoothing, red slip			Serving	Good example or WC finishing covered by red slip (protuberant grains coming out of the slip)
AB3.D1 (2)	AB3.133.1	AB3III3	Rim	CCC/T	17	3,5	Sorted/Sieved/Tempered	4	Medium - Fine	0,8	>body	Inside	YES	Oblique (i-o)	Pinching, drawing	Inside	YES	LHC (shaving)	LHC smoothing, red slip			Serving/storage	Calcite layer on surface, coils on the body could be different, since we are on the rim part
AB3.C3 (2)	AB3.133.3	AB3III3	Rim	CRD	10	6	Tempered?	1	Coarse - Medium	0,7	body	Outside	YES	Alternate	Pinching, drawing	Inside	YES	(shaving with tool similar	Red/white			Serving	that probably they are shaving with a tool that produces traces similar to the one used at AO for scraping, but here it
AB2.A1 (4)	AB2.35a	AB2II2	Body	R?	N/A	5	Unprepared	Outlier	Granule - Coarse	1,5	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside/Inside	YES	WC (scraping)	LHC smoothing, possibly some			Serving/storage	LHC external erased finishing. Regular topography, but assembled elements visilbe on the section
AB2.A2 (4)	AB2.57b	AB2II2	Body	CML/MLC	N/A	7	Unprepared	Outlier	Granule - Coarse	1,7	N/A	N/A	N/A	Oblique (i-o) spiral?	Pinching, drawing	Outside/Inside	YES	WC (scraping) (int), maybe	LHC smoothing?			Cooking	Geometric incisions internal surface, done with sharp tool, looks like WC finishing inside, possibly same outside + LHC
AB2.G1 (3)	AB2.56.S2	AB2IV3	Body	U?	N/A	9	Unprepared	3	Coarse - Medium	1,6	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Inside/ejected	YES	LHC (shaving)	smoothing? Orange slip (ext)			Serving/storage	Interesting traces: AO striations but grains inside and comets: shaving? Topography is perfect thought, so check!
AB2.A3 (1)2	AB2.35b	AB2II2	Body	CSC (U)	N/A	8	Unprepared	1(subgroup)	Granule - Coarse	1,5	N/A	N/A	YES	Oblique (o-i)	Pinching, drawing	Inside/ejected	YES	LHC (shaving)	LHC smoothing? Red slip			Serving/storage	finishing+LHC smoothing or just LHC finishing.. i go for the latter, there are comets and no hints of grains outside from
AB2.L1 (1)1	AB2.35.S3	AB2II2	Base+annular	R?	N/A	7	Tempered?	5	Very coarse - Medium	1,5	N/A	N/A	YES	Spiral?	Pinching, drawing	Outside/Inside	YES	WC (scraping)	Red slip, LHC smoothing			Serving/storage	Nice traces of WC finishing int surf, and ext surf traces of WC finishing, slip, and LHC work. annular coil 12mm
AB2.H1 (2)	AB2.35c	AB2II2	Body	R?	N/A	9	Unprepared	6	Coarse - Medium	1,2	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside/Inside	YES	WC (scraping)	LHC smoothing, red slip (ext)			Serving/storage	surface: shows that AO striations are possibly done with tool (not finger), because there are tool marks and

MF group	Sherd code	Stratigraphy	Vessel part	Shape	(cm)	Wall thickness (mm)	Macro-assessment	Petrographic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equidistant	Position	Pre-forming	Grain position	Striations	Finishing	Surface treatment	Firing T	Context	Proposed use	Comments
AB2.C1 (2)	AB2.57 c	AB2II2	Body	R	N/A	8	Unprepared	3	Coarse - Fine	1,4	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside /Inside	YES	WC (scraping)	LHC smoothing, red slip (ext)			Serving /storage	Good traces, contrast ext and int surface. Flat sherd
AB2.D3 (2)3	AB2.35 .1	AB2II2	Rim	CRD	15	5	Sorted/sieved	1(subgroup)	Coarse - Fine	1-1.5	>body	Outside	YES	Alternate	Pinching, drawing	Outside /Inside	YES	WC	smoothing, red slip, some			Serving	Good traces, but confusing WC... does not lilke LHC finishing, but could be
AB2.E3 (1)1	AB2.35 .2	AB2II2	Rim	CRD	25	8	Unprepared	2	Coarse - Fine	1,7	body	Outside	YES	Oblique (o-i)	Pinching, drawing	Outside /Inside	YES	LHC? it is not clear, but	LHC smoothing, red slip (ext)			Serving /storage	Confusing traces: inside looks like wc work at some parts, but mainly looks like shaving
AB2.H4 (3)	AB2.35 .S2	AB2II2	Body	CML/MLC	N/A	6,5	Unprepared	2	Coarse - Medium	1,3	N/A	N/A	N/A	Oblique (o-i)	Pinching, drawing	Outside	NO	WC (fingers?)	N/A			Cooking	inside, like on sample AB2.57b,but no striations, different finishing? Also no fire marks.
AB2.L3 (1)	AB2.57 .S2	AB2II2	Base+annular	U	N/A	9	Unprepared	1(subgroup)	Very coarse - Medium	N/A	N/A	N/A	N/A	N/A	Piching, drawing, maybe crushing	Inside/ejected	YES	LHC (shaving)	Red slip, burnishing			Serving /storage	one seems like on top of the other, but there are oblique junctures as well, not clear how they were positioned...
AB2.D3 (3)	AB2.58 .4	AB2II2	Rim	O	30	4	Sorted/sieved	3	Coarse - Fine	1,3	N/A	Outside	N/A	N/A	Pinching, drawing	Outside /Inside	YES	WC (scraping)	smoothing, red slip (both),			Cooking/serving	(inside), followed by LHC smoothing, incisions: criss-cross bands of parallel lines positioned below and oblique
AB2.O2	AB2.56 .1	AB2IV3	Rim	CC	20	6	Outlier	Outlier		1	body	Inside	YES	Oblique (i-o)	Pinching, drawing	Inside	NO	LHC?	Brown slip, burnishing			Serving	Traces are not clear due to heavy LHC work
AB2.H2 (1)	AB2.56 .S1	AB2IV3	Body	U	N/A	10	Unprepared	Outlier	Coarse - Medium	1,2	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside /Inside/ Ejected	YES	WC (scraping)	smoothing, brown slip (int			Serving /storage	Slightly smoked inside, SUPER clear oblique coils in the X section, nice WC scraping traces
AB2.L1 (1)2	AB2.22 .S1	AB2I1	Base+annular	U	N/A	9	Tempered?	1	Very coarse - Medium	1.4?	N/A	N/A	N/A	Spiral?	Pinching, drawing	Outside /Inside	YES	WC (scraping)	LHC smoothing, red slip (ext)			Serving /storage	Annular base (coil 15mm), nice coil cracks, as usual annular coil applied and smeared after base dried
AB2.A3 (2)3	AB2.57 .1	AB2II2	Rim	CR	17	7	Unprepared	6	Granule - Coarse	1,1	body	Outside	YES	Oblique (o-i)	Pinching, drawing	Inside	NO	LHC?	smoothing, red slip (ext),			N/A	obscured finishing traces, which are inconclusive. no grains outside and striations, but could be hidden.
AB2.A1 (1)1	AB2.57 a	AB2II2	Body	R	N/A	8	Unprepared	1	Granule - Coarse	1,1	N/A	N/A	YES	Oblique (o-i)	Pinching, drawing	Outside /Inside	YES	WC (scraping)	LHC smoothing, red slip (ext)			Storage	LHC work on the outside only, good traces inside from scraping
AB2.D3 (1)	AB2.58 .3	AB2II2	Rim	O	10	6	Sorted/sieved	Outlier	Coarse - Fine	1,4	N/A	Outside	N/A	N/A	Pinching, drawing	Inside	NO	LHC?	slip (both), burnished (ext)			N/A	Tool mark below thickened lip. Surface treatment erased all finishing tracesa
AB2.F1 (1)	AB2.22 .3	AB2I1	Rim	CRC	18	7	Sieved/sorted/tempered	Outlier	Fine - Very fine	1,4	body	Inside	YES	Oblique (i-o)	Pinching, drawing	Outside /Inside	YES	(fingers or scraping)	smoothing, orange/ white/re			Storage	Polychrome!! Nice traces, fine paste! Honduran? or Managua?
AB2.F3	AB2.57 .5	AB2II2	Rim	CRD	10	6	Sieved/sorted/tempered	4	Fine - Very fine	0,7	body	Outside	YES	Oblique (o-i)	Pinching, drawing	Inside/ejected	NO	N/I	N/I, burnished white paint			Serving	Paste is actually similar to AB2.22.3 (check petro!), might have had black on the white at the external wall
AB2.I3(1)	AB2.22 .1	AB2I1	Rim	CRD	30	11	Unprepared	2(subgroup)	Very coarse - Medium	1,2	body	Outside	YES	Oblique (o-i)	Pinching, drawing	Outside /Inside	YES	WC (scraping, fingers)	smoothing (mild, some parts),			Serving /storage	Good traces, striations are inside only (check padel and anvil gesture hypothesis)

MF group	Sherd code	Stratigraphy	Vessel part	Shape	(cm)	Wall thick-ness (mm)	Macro-assess-ment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equi-distant	Position	Pre-forming	Grain position	Striations	Finishing	Surface treatment	Firing T	Context	Propo-sed use	Comments
AB2.B3 (1)	AB2.57.2	AB2II2	Rim	CRD	17	8	Tempered ?	Outlier	Very coarse - Medium	1,1	body	Inside	YES	Oblique (i-o)	Pinching, drawing	Outside /Inside	NO	WC (fingers ?)	smoothing (ext), section with			Serving	Nice color effects on the outside using the smoked surfaces as aesthetical factors for coloring
AB2.L3 (4)	AB2.39.1	AB2II2	Rim	CR	45	7	Tempered ?	Outlier	Very coarse - Medium	1,2	body	Outside	YES	Oblique (o-i)	Pinching, drawing	Outside /Inside	YES	WC (scraping)	LHC smoothing, red slip			Serving /storage	clear void and inclusion orientations, scraping striations inside, so paddle and anvil gesture varies
AB2.O1	AB2.60.1	AB2II2	Rim	CRD	20	6,5	Outlier	Outlier		0,9	body	Outside	YES	Oblique (o-i)	Pinching, drawing	Inside	NO	LHC? it is not clear, but	smoothing, orange slip			Serving	finishing, LHC surface treatment might have obscured traces. there are a few protuberant grains on the

C Rims

Rim Code	U/R	Shape	Wall ∠ (°)	Base ∠ (°)	(cm)	%	Wall (mm)	Rim profile	Rim ∠ (°)	Lip morphology	Comments
AB1II2.9(7)	U	CR	90		15	3	8	Excurvated	50	Thinned inside	
AB4III2.?	U	CRD	70		15	7	8	Excurvated	50	Round	
AB6II3.114(1)	U	P	25		40	3	4	Direct	25	Thickened inside	
AB6II3.114(2)	U	NI	40		25	7	4	Direct	40	Thickened	
AB6II3.114(3)	R	CCC	140		5	6	6	Direct	140	Slightly flat	
AB6II3.114(4)	R	CRC	130		20	7	6	Direct	130	Round	
AB6II2.112(1)	U	P	5		20	3	5	Direct	5	Thickened & beveled exterior	
AB6II2.112(2)	U	NI	60		15	1	5	Direct	60	Thickened outside	
AB1II4.29	R	O	120		15	6	7	Excurvated	35	Thickened outside	
AB1II3.23	U	CC	40		35	3	3	Direct	85	Thickened & beveled outside	
AB1II2.9(1)	U	CR	90	50	25	7	4	Excurvated	105	Thickened outside & round	
AB1II2.9(2)	R	O	120		15	7	5	Excurvated	45	Thickened outside	
AB1II2.9(3)	U	CR	90		30	4	8	Excurvated	50	Thickened & beveled inside	
AB1II2.9(4)	U	CRD	60		25	4	7	Everted	0	Everted & round	
AB1II2.9(5)	U	CRD	70		20	5	8	Everted	0	Everted & round	
AB1II2.9(6)	U	CRD	60		35	5	6	Excurvated	45	Thickened	
AB1I2.6(1)	U	CR	80		28	3	9	Direct	80	Flat	
AB1I2.6(2)	R	O	115		7	5	3	Excurvated	55	Thickened inside	
AB1.I2.2(1)	R	O	120		8	10	7	Outflaring straight	75	Beveled outside	Short neck
AB1.I2.2(2)	R	CCC	85		20	4	7	Incurved	110	Flat	
AB1II2.12(1)	R	O	130		35	4	9	Excurvated	30	Thinned	
AB1II2.12(2)	NI	NI	NI		53	10	9	Direct	25	Thickened inside	
AB1II2.12(3)	U	CR	90		25	5	8	Excurvated	40	Round	
AB1II2.12(4)	NI	NI	90		15	4	7	Excurvated	55	Round	
AB1II2.12(5)	U	CR	90		15	12	9	Excurvated	40	Everted & tapered outside	
AB1II2.12(6)	U	CRD	70	60	25	10	7	Excurvated	45	Round	
AB1II2.12(7)	NI	NI	110		7	15	7	Everted	20	Everted & thinned	
AB1II2.12(8)	R	O	110		10	3	4	Excurvated	70	Thickened inside	
AB1II2.12(9)	U	CRD	45		15	4	4	Direct	45	Thickened inside	
ABII2.57(11)	U	CRD	70		17	2	8	Direct	70	Thickened & beveled inside	
ABII2.57(4)	U	CRD	60		12	4	6,5	Outflaring straight	30	Thinned	
ABII2.57(12)	U	CRD	50		15	3	6	Direct	50	Round	Slightly curved walls
ABII2.57(5)	U	CRD	60		10	6	6	Direct	60	Round	
ABII2.57(3)	R	O	105		10	10	6	Excurvated	70	Round	Long, serving?
ABII2.57(2)	U	CRD	50		17	4	8	Direct	50	Thickened inside & beveled outside	
ABII2.57(1)	U	CR	85		17	2	7	Excurvated, slightly everte	40	Thickened, beveled inside	
ABII2.57(10)	U	CRD	70		20	3	6,5	Direct	70	Thickened inside	
ABII2.57(9)	NI	NI	45		15	5	13	NI	35	Round	
ABII2.57(8)	NI	NI	50		25	5	13	NI	40	Thickened inside	
ABII2.57(7)	R	O	125		11	5	12	Excurvated	20	Thinnen, slightly everted & beveled outs	Short neck
ABII2.57(6)	U	CRD	50		20	3	5	Direct	50	Thickened	
AB2II2.35(6)	U	CRD	60		15	4	6	Direct	60	Round	
AB2II2.35(3)	U	CRD	75		10	10	6	Excurvated	50	Flat	
AB2II2.35(2)	U	CRD	70		25	5	7	Direct	70	Thickened inside	
AB2II2.35(5)	U	CR	80		28	2	5	Excurvated (slightly)	70	Thickened, flat	
AB2II2.35(1)	R	O	110		8	12	6	Excurvated	95	Thickened inside	Long, serving?
AB2II2.35(4)	U	CCD	100		15	5	4,5	Excurvated	60	Thickened, beveled inside	
AB2II2.60(4)	U	CRD	70		8	5	5	Direct	70	Thickened	
AB2II2.60(2)	U	CRD	75		15	5	5	Direct	75	Thickened inside	
AB2II2.60(1)	U	CRD	75		20	5	6,5	Direct	75	Thickened inside & slightly flat	
AB2II2.60(5)	U	NI	50		15	3	5	Direct	50	Round	

Rim Code	U/R	Shape	Wall ∠ (°)	Base ∠ (°)	(cm)	%	Wall (mm)	Rim profile	Rim ∠ (°)	Lip morphology	Comments
AB2II2.60(3)	U	CRD	40		17	3	6	Direct	40	Round	
AB2IV3.56(2)	NI	NI	45		20	4	7	NI	30	Round	
AB2IV3.56(1)	U	CC	50		20	3	6	Incurved	70	Thinned	
AB2III3.54	U	CRD	45		30	3	8,5	Direct	45	Beveled both sides	
AB2I1.22(1)	U	CRD	50		30	4	11	Excurvated	30	Thickened inside	
AB2I1.22(3)	R	CRC	115		18	5	7	Direct	110	Slightly thinned	
AB2I1.22(2)	U	CR	80		15	5	5,5	Direct	80	Round	
AB2II2.39(5)	U	CRD	40		9	5	5	Direct	40	Round	
AB2II2.39(2)	U	CR	90		10	10	5	Direct	90	Flat, thickened inside	
AB2II2.39(4)	R	CRC	130		5	5	5	Direct	130	Thinned	
AB2II2.39(3)	U	CRD	65		10	2	3,5	Direct	65	Flat, thickened inside	
AB2II2.39(1)	U	CR	80		45	2	7	Outflaring straight	50	Thickened inside	
AB2II2.58(5)	U	CR	80		35	2	5	Excurvated	55	Thickened inside, beveled outside	
AB2II2.58(2)	U	CRD	70		17	6	8	Excurvated	40	Round	
AB2II2.58(7)	U	CRD	65		17	2	4,5	Excurvated	40	Round	
AB2II2.58(6)	U	P	0		40	3	4	Vertical	25	Round	
AB2II2.58(3)	R	O	110		10	5	6	Excurvated	70	Thickened inside	Long, serving?
AB2II2.58(1)	U	CRD	40		30	2	5	Direct	40	Thickened outside	
AB2II2.58(8)	R	O	120		7	2	4,5	Direct	70	Thickened inside	
AB2II2.58(4)	R	O	80		30	5	4	Excurvated	50	Everted, beveled outside	
AB2IV3.56(1)	NI	NI	NI		30	2	20	NI	50	Slightly thickened inside	Looks like an olla
AB2IV3.56(2)	R	CC	75		19	5	7	Incurved	100	Round	
AB2I1.22(1)	R	CC	110		50	2	8	Incurved	125	Thickened	
AB2I1.22(2)	NI	NI	100		35	3	7	Excurvated	50	Thickened outside	
AB2I1.22(3)	R	CCC	135		20	4	9	Incurved	130	Beveled outside	
AB2I1.22(4)	U	CRD	65		14	5	7,5	Direct	65	Round	
AB2.22	U	Collander			body		2,5				Orifices are 2.5mm diam (irregular, not done with one stroke with circular tool)
AB2.35.S1	R	Collander			body		3				one stroke), gesture from outside to inside
AB2.60.S2	R	Collander			body		3				possibly done with one tool on one stroke), gesture from outside to inside
AB2.58.S2	U	Collander			body		2,5				Orifices 2mm diam, regular shape
AB2.39.S1	U	Collander			body		3,5				Orifices >2mm diam, regular shape
AB2.60	U	Collander			body		7,5				Orifices 2.5mm, regular shape

D Decoration & Appendages

MF Group	Sample Code	Part	Incision	Punctuation	Appliqué	Zoomorphic	Anthropo-morphic	Paint	Double slip	Acanaladura	Impression	Comments
AB2.H4(5)	AB2.60	Shoulder	1	0	0	0	0	0	0	0	0	Parallel lines (<0.5mm), ext surface, LHC clay
AB2.H4(5)	AB2.60	Body	1	0	0	0	0	0	0	0	0	Bands of subparallel incions (>1mm) oblique to each other, ext surface
AB2.H4(5)	AB2.57	Body	1	0	0	0	0	0	0	0	0	Parallel lines (<0.5mm), ext surface, LHC clay
AB2.H3(1)	AB2.35.3	Rim	0	0	0	0	0	0	1	0	0	Red/orange
AB2.H3(3)	AB2.5	Shoulder	1	0	0	0	0	0	0	0	0	Geometric criss-cross incison (<0.5mm), ext surface, LHC. RJ says looks like Honduran paste, Reina incised from Copan (AD 600-800)
AB2.H2(3)	AB2II2	Shoulder	1	0	0	0	0	0	0	0	0	Bands of subparallel incions (>1mm) oblique to each other, ext surface
AB2.H2(2)	AB2.60	Shoulder	1	0	0	0	0	0	0	0	0	Bands of subparallel incions (>1mm) oblique to each other, ext surface
AB2.H1(1)	AB2.39	Body	1	0	0	0	0	0	0	0	0	Subparallel lines (1mm), ext surface, LHC, deeper than other incisions, vessel part is unclear if it is shoulder or body
AB2.I3	AB2.II2	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.I1(1)	AB2.60	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.I1(3)	AB2.35	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.L3(2)2	AB2.54.1	Rim	0	0	0	0	0	0	1	0	0	Red/orange, both surfaces
AB2.L3(1)	AB2.35	Body	0	0	0	0	0	0	1	0	0	Red/orange, both surfaces
AB2.I4(5)	AB2.57	Body	0	0	1	0	0	0	0	0	0	Handle or support scar (18mm diam)
AB2.L4(4)	AB2.57	Shoulder	1	0	0	0	0	0	0	0	0	Geometric criss-cross incison (1-1.5mm), ext surface, WC
AB2.L4(7)	AB2.56	Body	1	0	0	0	0	0	0	0	0	Subparallel lines (<0.5mm), ext surface, LHC
AB2.L4(7)	AB2.57	Body	1	0	0	0	0	0	0	0	0	Subparallel lines (<0.5mm), unclear if int or ext surface, LHC, one line perpendicular done after the band of subparallel ones
AB2.L2(1)	AB2II2	Body	0	0	0	0	0	0	1	0	0	Red/orange, int surfac
AB2.L1(1)	AB2II2	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.L1(2)	AB2.60	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.D1(1)	AB2.57	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.D1(1)	AB2.57	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.D1(1)	AB2.57	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.D1(1)	AB2.39	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.D1(1)	AB2.58.6	Rim/base	1	0	1	0	0	0	0	0	0	Applied coil on the juncture between base and body/rim (plate), with subparallel incisions (1mm) the height of the coil (4mm)
AB2.D2(2)	AB2II2	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.D2(2)	AB2II2	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.D2(2)	AB2.57	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.D2(2)	AB2.57	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.D3(1)	AB2.58	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.D3(2)1	AB2.57.10	Rim	0	0	0	0	0	0	1	0	0	Red/orange, both surfaces
AB2.E1(3)	AB2.39	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.E4(4)	AB2.58	Shoulder	1	0	0	0	0	0	0	0	0	Bands of subparallel incions (1mm), ext surface
AB2.E3(3)	AB2.39	Shoulder	1	0	0	0	0	0	0	0	0	Subparallel lines (<0.5mm), ext surface, LHC
AB2.A1(1)	AB2.57	Shoulder	0	0	0	0	0	0	1	0	0	Red/orange, ext surface

MF Group	Sample Code	Part	Incision	Punctuation	Appliqué	Zoomorphic	Anthropo-morphic	Paint	Double slip	Acanaladura	Impression	Comments
AB2.A1(1)	AB2.57	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.A1(1)	AB2.60	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.A1(1)	AB2.60	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.A1(2)	AB2.56	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.A1(2)	AB2.39	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.A1(2)2	AB2.60	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.A1(2)3	AB2.54	r	1	0	0	0	0	0	0	0	0	Subparallel incisions (<05.mm), int surface, WC
AB2.A2(1)	AB2.57	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.F3(2)	AB2.57	Body	0	0	0	0	0	1	0	0	0	Red/white, ext surf
AB2.F3(2)	AB2.58	Body	0	0	0	0	0	1	0	0	0	Red/white, int surf
AB2.F1	AB2.35	Base+support	0	0	1	0	0	0	0	0	0	oval support (16x20mm), white slip ext surf
AB2.B1(1)	AB2.60	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.B1(2)	AB2.22	Base	0	0	1	0	0	0	0	0	0	Annular base, (coil 7mm wide)
AB2.B1(5)	AB2.II2	Shoulder	1	0	0	0	0	0	0	0	0	Subparallel incisions (<05.mm), ext surf, LHC?
AB2.B4(5)	AB2.35	Body (cicatriz de empate)	1	0	1	0	0	0	0	0	0	Subparallel incisions (<0.5mm) oblique to applique coil (6.5mm wide), could be a reinforcement for assembling another part of the vessel, but unclear. also, has smoothing on it
AB2.B2(1)	AB2.60	Body	1	0	0	0	0	0	0	0	0	Bands of suparallel incisions (<0.5mm) oblique to each other, LHC, ext surf
AB2.B3(2)	AB2.57	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.B3(3)	AB2.58	Body	0	0	0	0	0	0	1	0	0	Orange/white, int surf (flat sherd, plate?)
AB2.C3(1)	AB2.22	Body	0	0	0	0	0	0	1	0	0	Red/orange, both surfaces
AB2.C3(1)	AB2IV3	Body	0	0	0	0	0	0	1	0	0	Red/orange, both surfaces
AB2.C3(1)	AB2II2	Body	0	0	0	0	0	0	1	0	0	Red/orange, both surfaces
AB2.C3(5)	AB2.58.2	Rim	0	0	0	0	0	0	1	0	0	Red/orange, both surfaces
AB2.C4(4)	AB2.57	Shoulder	1	0	0	0	0	0	0	0	0	Bands of subparallel incisions (<0.5mm) criss crossing each other, ext surf
AB2.F3(1)	AB2.57.7	Rim	0	0	0	0	0	1	0	0	0	Black and red/white, black ext surface, one line parallel to the lip(3mm wide), red nside
Outlier	AB2.39	Body	0	0	0	0	0	0	0	0	0	Red/orange, ext surface
Outlier	AB2.58	Support?	0	0	1	0	0	0	0	0	1	not sure if its a support, min vessel, or adoro
Outlier	AB2.39	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
Outlier	AB2.57	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface, super flat sherd
Outlier	AB2.58	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surface
AB2.H4(3)	AB2.35.S2	Body	1	0	0	0	0	0	0	0	0	Bands of subparallel incisions (<1mm) criss crossing each other, int surf, molcajete?
AB2.A3(1)2	AB2.35b	Shoulder	0	0	0	0	0	0	0	0	0	Negative slip making the effect of red bands perpendicular to the vessel mouth?
AB2.A2(4)	AB2.57	Body	1	0	0	0	0	0	0	0	0	Bands of subparallel incisions (<1mm) oblique to each other, geom pattern, molcajete? LHC
AB2.D3(3)	AB2.58.4	Rim	1	0	0	0	0	0	0	0	0	Bands of subparallel incisions (<1mm), criss crossing each other, WC?
AB2.L3(1)	AB2.57.S2	Base	0	0	1	0	0	0	0	0	0	Annular base (coil 15mm)
AB2.L1(1)2	AB2.22.S1	Base	0	0	1	0	0	0	0	0	0	Annular base (coil 13mm)
AB2.L1(1)1	AB2.35.S3	Base	0	0	1	0	0	0	0	0	0	Annular base (coil 15mm)

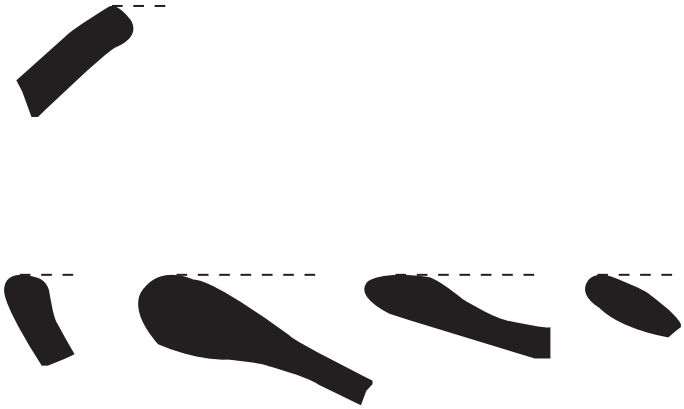
MF Group	Sample Code	Part	Incision	Punctuation	Appliqué	Zoomorphic	Anthropo-morphic	Paint	Double slip	Acanaladura	Impression	Comments
Totals			**21**	**0**	**9**	**0**	**0**	**3**	**38**	**0**	**1**	
AB3.C4(4)	AB3.133	Body	1	0	0	0	0	0	0	0	0	Incised line (<1mm), LHC, int surf
AB3.C4(4)	AB3.84	Body	1	0	0	0	0	0	0	0	0	Incised line (1mm), LHC, int surf
AB3.C1(5)	AB3.133	Body	0	0	0	0	0	0	0	1	0	3.5mm wide acanaladura
AB3.C3(2)	AB3.133	Body	0	0	0	0	0	0	1	0	0	Red/white, both surfaces
AB3.C3(2)	AB3.99	Body	0	0	0	0	0	0	1	0	0	Red/white, ext surface
AB3.C3(1)	AB3.99	Body+base+support+lug	0	0	1	0	0	0	0	0	0	Red slipped, flat lug, scar of huge hollow support (>40mm)
AB3.A3(4)	AB3.99	Body	0	0	0	0	0	0	1	0	0	Red/white, int surf
AB3.A1(2)	AB3.84	Base+support	0	0	1	0	0	0	0	0	0	11.5x8mm small oval support
AB3.B1(1)	AB3.?	Base+support	0	0	1	0	0	0	0	0	0	Support scar, too fragmentary
AB3.B1(2)	AB3.133	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surf
AB3.B2(2)	AB3.133	Neck	1	0	0	0	0	0	0	0	0	chaotic lines (1mm), ext surf, lhc
AB3.B3(1)	AB3.90	Body	0	0	0	0	0	0	1	0	0	Red/orange, int surf
AB3.B3(1)	AB3.133	Body	0	0	0	0	0	0	1	0	0	Red/orange, ext surf
AB3.B3(2)	AB3.90	Body	0	0	0	0	0	0	1	0	0	Red/orange, int surf
AB3.B3(4)	AB3.133	Body	0	0	0	0	0	0	1	0	0	Red/white, int surf
AB3.OUTLIER	AB3.133	Body	0	0	0	0	0	0	1	0	0	Red/white, ext surface
AB3.A3(3)	AB3.90.1	Rim	0	0	0	0	0	0	1	0	0	Red/orange, int and ext surf (but see detail on lip)
AB3.D1(2)	AB3.133.1	Rim	0	0	0	0	0	0	1	1	0	Red/white, ext surface + acanaladura on lip
AB3.C3(2)	AB3.133.3	Rim	0	0	0	0	0	0	1	0	0	Red/white, int surf
AB4.B2(1)	AB4.81	Body	0	0	0	0	0	0	1	0	0	Red/white, segun Jorge es Usulutan Muerdelo
AB6.D1(1)	AB6.112	Body	0	0	1	0	0	0	0	0	0	Applique 4.5mm wide on ext surf, not clear

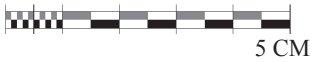
AB1

AB2

AB4

AB6





Appendix 10

Josefa Ocón Robleto ceramic analysis

A Macrofabric

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Organic	Fre-quency	Sorting	Round-ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Fracture	Feel	Induc-tion1 (grs)	Induc-tion2 (grs)	Induc-tion3 (grs)	Induc-tion4 (grs)
JOR2.MM	Coarse	1	0	1	1	1	1	0	1	0	5-10%	MS	LS	Angular/Subangular/Subrounded/Rounded	Chaotic	Plate/Oval-sphere	Subparallel/Oblique/Chaotic	2-4-16	H	Fine	Harsh	0	0	0	30,4
JOR2.AAA	Coarse - Medium	1	1	0	1	1	1	0	0	0	5-15%	WS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate/Oval-sphere	Chaotic	2-8	H	Fine	Powdery	10,3	4,8	27,4	44,9
JOR2.DDD	Coarse - Medium	1	1	1	0	1	1	0	0	0	5-10%	WS/PS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate/Irregular	Oblique	2	H	Fine	Smooth	111	0	17,5	30,7
JOR2.EEE	Coarse - Medium	1	1	1	1	1	0	0	0	0	15%	PS	HS	Subangular/Subrounded/Rounded	Chaotic	Irregular	Chaotic	2-16	H	Fine	Rough	0	0	0	31,1
JOR2.FFF	Coarse - Medium	1	1	0	1	1	1	0	0	0	15-20%	MS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate/Irregular	Subparallel/Oblique/Chaotic	2	S	Fine	Rough	5,6	29,9	38,6	120
JOR2.GGG	Coarse - Medium	1	0	0	1	1	1	0	0	0	10%	MS	HS	Angular/Subangular/Subrounded/Rounded	Chaotic	Irregular	Chaotic	2-4-20	H	Fine	Rough	43,1	0	0	36,3
JOR2.HHH	Coarse - Medium	1	0	1	0	1	1	0	0	0	10-15%	WS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate	Oblique	2	H	Fine	Rough	0	3,7	7,6	140,8
JOR2.III	Coarse - Medium	1	0	1	0	1	1	0	0	0	10-20%	PS	HS/LS	Angular/Subangular/Subrounded/Rounded	Chaotic	Plate/Irregular	Oblique/Chaotic	2-16	H	Fine	Harsh	0	0	18,2	48,5
JOR2.JJJ	Coarse - Medium	1	1	0	0	1	1	0	0	0	20%	VWS	LS	Angular/Subangular/Subrounded/Rounded	Parallel/Chaotic	Plate/Irregular	Oblique/Concentric/Chaotic	2-8-10-18	H	Fine	Rough	15,7	0	48,3	74,3
JOR2.KKK	Coarse - Medium	1	1	1	1	1	1	0	0	0	15%	MS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate/Irregular	Oblique/Chaotic	2-4-16-22	S	Fine/Hackly	Smooth	82,4	17,3	118	1094
JOR2.A	Fine	1	1	0	1	1	1	0	0	0	5-10%	WS	HS	Angular/Subangular	Chaotic	Oval-sphere	Chaotic	1-9	H	Fine	Smooth	0	0	37,5	0
JOR2.C	Fine	1	1	0	0	1	0	0	1	0	10-15%	MS	HS	Subangular/Subrounded	Chaotic	Plate/Oval-sphere	Chaotic	1-3	S	Fine	Smooth/Powdery	19,8	0	0	4,2

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Organic	Fre-quency	Sorting	Round-ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Fracture	Feel	Induc-tion1 (grs)	Induc-tion2 (grs)	Induc-tion3 (grs)	Induc-tion4 (grs)
JOR2.B	Fine - Very fine	1	0	1	0	0	1	1	0	0	15-20%	MS	HS	Subrounded/Rounded	Chaotic	Oval-sphere	Chaotic	1	S	Smooth/ Fine	Smooth/ Powdery	0	7,4	3,8	4,3
JOE2.L	Fine - Very fine	1	0	0	0	1	1	0	0	0	10-15%	WS	HS	Subrounded/Rounded	Chaotic	Oval-sphere/Irregular	Oblique/Chaotic	1-9	S	Smooth/ Fine	Smooth/ Powdery	0	6,6	9,8	6,2
JOR2.Q	Fine - Very fine	1	0	1	1	1	0	0	0	0	5-10%	WS	HS	Subangular/Subrounded/Rounded	Oblique/ Chaotic	Plate/Oval-sphere/Irregular	Chaotic	1-9	H	Smooth/ Fine	Smooth	9,6	0	0	51,5
JOR2.FF	Granule - Very coarse	1	0	0	0	1	0	0	0	0	20%	MS	LS	Angular/ Subangular/Subrounded	Chaotic	Plate	Oblique	8	VH	Irregular/ Hackly	Harsh	0	0	0	23,1
JOR2.GG	Granule - Very coarse	1	0	0	0	1	0	0	1	0	25-30%	WS	HS	Angular/ Subangular/Subrounded/Rounded	Oblique/ Concentric/Chaotic	Plate/Irregular	Subparallel/Oblique/Chaotic	2	S	Irregular	Rough	0	0	0	42,4
JOR2.LL	Granule - Very coarse	1	0	1	0	1	0	0	1	0	15%	MS	LS	Angular/ Subangular/Rounded	Chaotic	Plate	Oblique	2	VH	Irregular/ Hackly/Laminated	Harsh	0	0	24,1	0
JOE2.S	Medium	1	0	1	1	1	1	0	1	0	10-20%	WS	HS/LS	Angular/ Subangular/Subrounded/Rounded	Oblique/ Concentric/Chaotic	Plate/Irregular	Subparallel/Oblique/Concentric/Chaotic	2-16	H	Fine	Smooth	339	86,8	148	257,2
JOR2.X	Medium	1	1	1	1	1	1	0	0	0	10%	MS	LS	Angular/ Subangular/Subrounded/Rounded	Chaotic	Plate/Oval-sphere/Irregular	Oblique/Chaotic	2-8	H	Smooth/ Fine	Rough	12	0	27	6,3
JOR2.Z	Medium	1	0	1	1	1	1	0	0	0	5%	WS	HS	Angular/ Subangular/Subrounded/Rounded	Chaotic	Irregular	Chaotic	2	S	Fine	Powdery	8	6,4	0	9,6
JOR2.NN	Medium	1	1	0	1	1	1	0	0	0	5-10%	MS/PS	HS	Angular/ Subangular/Subrounded/Rounded	Parallel/ Oblique/ Concentric/Chaotic	Plate/Oval-sphere/Irregular	Oblique/Chaotic	2-4-16	S	Fine/Irregular	Rough	31	4,5	65,6	173,6
JOR2.OO	Medium	1	1	1	0	1	1	0	0	0	5-10%	WS	HS	Subangular/Subrounded/Rounded	Concentric/Chaotic	Plate	Subparallel/Concentric/Chaotic	2-4-10-12	S	Fine	Powdery	20,2	0	0	70,3
JOR2.PP	Medium	1	1	0	0	1	1	0	1	0	10-20%	WS	HS/LS	Angular/ Subangular/Subrounded/Rounded	Oblique/ Chaotic	Plate/Oval-sphere/Irregular	Subparallel/Oblique/Concentric/Chaotic	2-12-16	H	Fine	Powdery	31,4	3,6	30,2	125,7
JOR2.QQ	Medium	1	0	0	0	1	1	0	0	0	5%	MS	HS	Subangular/Subrounded	Chaotic	Oval-sphere	Chaotic	2	H	Fine	Powdery	18,5	0	0	26,1

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Organi c	Fre-quency	Sorting	Round-ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Fracture	Feel	Induc-tion1 (grs)	Induc-tion2 (grs)	Induc-tion3 (grs)	Induc-tion4 (grs)
JOR2.RR	Medium	1	1	0	1	1	1	0	1	0	10%	PS	LS	Angular/Subangular/Subrounded	Oblique/Concentric/Chaotic	Plate/Oval-sphere	Oblique/Chaotic	2-8-16	H	Fine	Powdery	15	0	0	204,5
JOR2.SS	Medium	1	1	1	0	1	1	0	1	0	10%	MS	HS/LS	Subangular/Subrounded/Rounded	Chaotic	Plate/Irregular	Oblique	2-10	H	Irregular	Rough	16,6	0	0	9,8
JOR2.TT	Medium	1	1	1	0	1	1	0	0	0	10-15%	WS	HS/LS	Angular/Subangular/Subrounded/Rounded	Concentric/Chaotic	Plate/Irregular	Oblique	10	H	Hackly	Smooth	9,6	0	0	22,8
JOR2.UU	Medium	1	1	0	0	1	1	0	0	0	5-15%	WS/MS	HS/LS	Angular/Subangular/Subrounded/Rounded	Chaotic	Plate/Oval-sphere/Irregular	Horizontal/Chaotic	8-10	H	Fine	Smooth	31,6	84,5	31,5	83,1
JOR2.VV	Medium	1	1	0	0	0	1	0	0	0	10%	MS	HS	Subangular/Subrounded/Rounded	Chaotic	Plate	Parallel	10	H	Fine	Rough	25,8	0	0	21,2
JOR2.WW	Medium	1	1	1	0	1	1	0	0	0	10-15%	WS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate	Subparalle/Chaotic	2-10	H	Fine	Smooth	27,6	0	0	0
JOR2.XX	Medium	1	1	1	1	1	1	0	0	0	5-10%	WS	HS/LS	Subrounded/Rounded/Welrounded	Chaotic	Plate/Oval-sphere/Irregular	Concentric/Chaotic	2-16	H	Fine	Powdery	11,1	0	3,5	23,2
JOR2.YY	Medium	1	1	1	0	1	1	0	0	0	10%	PS	LS	Subangular/Subrounded	Chaotic	Plate/Irregular	Oblique/Chaotic	2-8	H	Hackly	Smooth	0	0	6,6	26,4
JOR2.ZZ	Medium	1	0	0	0	1	0	0	0	0	5-10%	WS	LS	Angular/Subangular/Subrounded	Oblique	Oval-sphere/Irregular	Chaotic	2	H	Fine	Rough	0	0	24,9	0
JOR2.CCC	Medium	1	0	1	1	1	1	0	0	0	10-15%	WS	HS	Subangular/Subrounded/Rounded	Chaotic	Irregular	Chaotic	2	H	Fine	Smooth	0	0	20,3	0
JOR2.W	Medium	1	0	1	0	1	1	0	1	0	5-10%	MS	HS	Angular/Subangular/Subrounded/Rounded	Chaotic	Oval-sphere/Irregular	Chaotic	2-16	H	Fine	Smooth	12,6	0	5	0
JOR2.BBB	Medium	1	0	1	1	1	1	0	0	0	20%	MS	LS	Angular/Subangular/Subrounded	Subparallel/Oblique	Plate/Irregular	Oblique/Chaotic	10	H	Fine	Powdery	0	8,6	0	12,2
JOR2.M	Medium	1	0	1	1	1	1	0	0	0	5-10%	WS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Chaotic	Oval-sphere/Irregular	Oblique/Chaotic	2-4	H	Fine	Smooth	33,5	0	15,8	57,9

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Organi c	Fre-quency	Sorting	Round-ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Fracture	Feel	Induc-tion1 (grs)	Induc-tion2 (grs)	Induc-tion3 (grs)	Induc-tion4 (grs)
JOR2.R	Medium	1	0	1	0	1	1	0	0	0	10-15%	VWS	HS	Subangular/Subrounded/Rounded/Flat	Chaotic	N/A	N/A	8-16	H	Fine	Smooth	67,9	0	0	0
JOR2.D	Medium - Fine	1	1	0	0	1	1	0	0	0	10-15%	WS	HS	Subangular/Subrounded	Subparallel-Concentric-Chaotic	Plate/Irregular	Chaotic	2-8	S	Smooth/Fine	Smooth/Powdery	26,8	0	15	16,5
JOR2.E	Medium - Fine	1	0	1	0	1	1	0	1	0	10-20%	WS-MS	HS	Subangular/Subrounded	Concentric/Chaotic	Plate/Oval-sphere/Irregular	Concentric/Chaotic	2-4	S/H	Fine/Hackly	Smooth	16,2	10,6	21,6	6
JOR2.F	Medium - Fine	1	1	0	0	1	1	0	1	0	15-20%	MS	HS	Angular/Subangular/Rounded	Concentric/Chaotic	Plate/Oval-sphere	Oblique/Chaotic	19	S/H	Smooth/Fine	Smooth/Rough	15,5	0	0	0
JOR2.G	Medium - Fine	1	0	1	0	1	1	0	0	0	5-10%	WS	HS	Angular/Subangular/Subrounded	Chaotic	Irregular	Subparallel	2-8-10	S	Fine	Smooth/Rough	0	0	4,4	25,8
JOR2.H	Medium - Fine	1	1	0	1	0	1	0	0	0	15-20%	WS	LS	Angular/Subangular/Subrounded	Chaotic	Plate/Rhombs	Chaotic	4-8	S	Smooth/Fine	Smooth/Powdery	7,3	8,4	0	30,5
JOR2.I	Medium - Fine	1	1	0	1	1	1	0	0	0	5-10%	MS	HS	Angular/Subangular	Subparallel/Chaotic	Plate/Oval-sphere	Subparallel/Oblique/Chaotic	4-16	S/H	Smooth/Fine	Smooth/Powdery	0	8,3	4,4	36,4
JOR2.J	Medium - Fine	1	1	1	1	1	1	0	0	0	10%	MS	LS	Subangular/Subrounded/Rounded	Chaotic	Plate/Oval-sphere/Irregular	Chaotic	2-8	H	Fine/Hackly	Rough/Smooth	3,4	4,4	0	14,4
JOR2.K	Medium - Fine	1	0	0	0	1	0	0	0	0	10%	WS	HS	Subangular/Subrounded/Rounded	Chaotic	Plate/Irregular	Oblique/Chaotic	8-10	S	Smooth/Fine	Smooth/Powdery	12,6	5,1	0	13,2
JOR2.O	Medium - Fine	1	0	0	1	1	1	0	0	0	15-20%	WS	HS	Subangular/Subrounded	Chaotic	Plate/Oval-sphere/Irregular	Horizontal/Chaotic	2	H	Smooth/Fine	Smooth	11	0	95,4	10,2
JOR2.P	Medium - Fine	1	0	0	0	1	1	0	0	0	5%	WS	HS	Subrounded/Rounded	Chaotic	Plate/Oval-sphere	Subparallel/Oblique/Chaotic	2-22	S	Smooth/Fine	Smooth	19,5	0	40,2	44,8
JOR2.T	Medium - Fine	1	0	1	0	1	1	0	1	0	15-20%	MS	LS	Subangular/Subrounded/Rounded	Chaotic	Plate/Oval-sphere	Subparallel/Oblique/Chaotic	2-4-10	H	Smooth/Hackly/Laminated	Smooth	25,7	0	33,2	9
JOR2.U	Medium - Fine	1	0	1	1	1	1	0	0	0	15%	WS	HS	Angular/Subangular/Subrounded	Oblique/Chaotic	Plate/Oval-sphere	Oblique	4	H	Smooth/Fine/Hackly	Rough	0	0	0	21,8
JOR2.V	Medium - Fine	1	1	1	1	1	0	0	0	0	10-15%	MS	LS	Subangular/Subrounded/Rounded	Chaotic	Plate/Oval-sphere/Irregular	Subparallel/Oblique/Chaotic	2-4-8-16	H	Smooth/Fine	Rough	34,8	0	60,4	50,7
JOR2.Y	Medium - Fine	1	1	0	0	1	1	0	0	0	10-20%	MS	LS	Subrounded/Rounded	Chaotic	Oval-sphere/Irregular	Chaotic	2	H	Smooth/Fine	Rough	8,5	0	19,3	5,6

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Organi c	Fre-quency	Sorting	Round-ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Fracture	Feel	Induc-tion1 (grs)	Induc-tion2 (grs)	Induc-tion3 (grs)	Induc-tion4 (grs)
JOR2.KK	Very coarse - Coarse	1	0	0	0	1	1	0	0	0	15%	MS	LS	Angular/ Subangular/Subrounded	Chaotic	N/A	N/A	10	H	Fine	Rough	0	0	8,2	0
JOR2.AA	Very coarse - Coarse - Medium	1	1	1	1	1	1	0	1	0	15%	WS	HS/LS	Angular/ Subangular/Subrounded/Rounded	Oblique	Plate	Subparallel	2-10-18	H	Irregular	Powdery	10,4	0	87	350,5
JOR2.BB	Very coarse - Coarse - Medium	1	1	1	0	1	1	0	1	0	10%	WS	HS	Subangular/Subrounded/Rounded	Chaotic	Plate	Subparallel	2	S	Fine/Irregular	Rough	9,5	0	0	26,7
JOR2.CC	Very coarse - Coarse - Medium	1	1	1	0	1	1	0	0	0	15-20%	PS	HS/LS	Angular/ Subangular/Subrounded/Rounded	Parallel/ Oblique/ Chaotic	Plate	Subparallel	2-4-10	H	Irregular	Harsh	43,3	54	0	23,6
JOR2.DD	Very coarse - Coarse - Medium	1	0	1	1	1	1	0	0	0	20%	VWS	HS	Angular/ Subangular/Subrounded/Rounded	Oblique/ Chaotic	Plate	Subparallel	4	H	Fine/Irregular	Rough	8,4	0	0	0
JOR2.EE	Very coarse - Coarse - Medium	1	0	0	0	1	1	0	0	1	25-30%	WS	LS	Angular/ Subangular/Subrounded	Subparallel/Oblique/Concentric	Plate	Parallel/Subparallel	18	H	Fine	Harsh	6,7	0	0	3,7
JOR2.HH	Very coarse - Coarse - Medium	1	0	0	0	0	0	0	0	0	25%	WS	LS	Subangular/Subrounded/Rounded	Chaotic	Plate	Oblique	16	S	Irregular	Harsh	0	0	0	11,1
JOR2.II	Very coarse - Coarse - Medium	1	0	0	1	1	1	0	0	0	15%	WS	HS	Subangular/Subrounded/Rounded	Chaotic	Plate	Oblique	2	H	Irregular	Powdery	0	0	44	0
JOR2.JJ	Very coarse - Coarse - Medium	1	0	0	0	1	0	0	1	0	5%	MS	HS	Subangular/Subrounded/Rounded	Chaotic	N/A	N/A	2	S	Fine	Rough	6,7	0	0	0
JOR2.N	Very fine	1	0	0	0	1	1	0	1	0	5%	VWS	HS	Subrounded/Rounded/Wellrounded	Chaotic	N/A	N/A	21	S	Smooth/ Fine	Smooth/ Powdery	0	0	0	8,1
JOR2.OUTLIERS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	57,1	33	5,2	114,7

B Macrotrace (petro)

MF group	Sherd code	Strati-gra-phy	Vessel part	Shape	(cm)	Wall thick-ness (mm)	Macro-assessment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Posi-tion LC	Equi-dis-tant	Position	Pre-forming	Grain position	Stria-tions	Finishing	Surface treat-ment	Firing T	Context	Pro-posed use	Comments
JOR2.KKK4	JOR2.41	JOR2V6	Body	O?	N/A	9-11	N/A	3		1,5	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside/Inside	NO	WC, scraping	LHC smoothing (outside)	<750 °C	Floor	Cooking/Storage	Surface undulation following cores, roughing out was not thorough (though effective)
JOR2.FF4(1)	JOR2V7	JOR2V7	Body/Base	O?	N/A	7-11	Temper?	2 (Subgroup)		1,7	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside/Inside	YES	WC, scraping	LHC smoothing (outside)	<750 °C	Floor	Cooking/Storage	Excellent traces, similar to JOR2.41, coils are felt because of the undulating topography of the sherd. Excess of clay due to fixing or carelessness on the smoothing process. Fire marks outside, especially on base section!
JOR2.UU2	JOR2.68.1	JOR2IV6	Rim	CR/O	35	11,5	Sieved/Sorted?	3		2,2	body	Outside	N/A	Oblique (i-o)	Pinching, drawing	Outside/Inside	NO	WC, scraping?	Slip and LHC smoothing (outside)	<750 °C	Feature (hearth)	Cooking/Storage	Carca rim, difficult to assess finishing due to heavy LHC st. However, a section left at the ext surface for decorative purposes (carca) leaves grains outside and some striations+irregular topography
JOR2.JJJ3	JOR2.68.2	JOR2IV6	Rim	CRD	25	8-10	Temper?	N/A		1,1	body	Outside	YES	Spiral?	Pinching, drawing	Inside/ejected	NO	LHC?	Red slip, LHC smoothing, burnishing (outside)	<750 °C	Feature (hearth)	Serving	Punctuated, tool mark around support scar. Extremely good roughing out, unlike the first two samples. Ejected grains due to burnishing? Doubted fashioning of base part, but clear coil juncture at support area
JOR2.HH4	JOR2.37	JOR2V7	Body	O?	N/A	8,5	N/A	2 (Subgroup)		1,5	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside/Inside	NO	WC, scraping	LHC smoothing (outside)	<750 °C	Floor	Cooking/Storage	Surface undulation marking coils, fracture through those
JOR2.GGG1	JOR2.62	JOR2V7	Body	CR	45	7-10	Sieved/Sorted?	2		1,5	>body	Outside	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	NO	LHC?	Red slip, LHC smoothing	<750 °C	Floor	Serving	Cannot assess finishing due to LHC finishing, might have erased steps. No real evidence of shaving. Chipote applique with punctuation in the middle on outer surface. Red slip band on lip
JOR2.A3	JOR2.27.2	JOR2II5	Rim	CRD	45	8	Sieved/Sorted?	2		1	>body	Outside	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	YES	WC, fingers & scraping?	Red slip, LHC smoothing	<750 °C	Floor	Cooking/Storage	Apparent combination of traces of use of fingers and tool for finishing (scraping and supporting with hand?)
JOR2.X20.4 (correct to JOR2II2!)	JOR2.45.5	JOR2V7	Rim	CRD	21	5.5-7	Temper?	N/A		1,5	body	outside	YES	Oblique (i-o)	Pinching, drawing	Outside/Inside	YES (slip)	WC?	Black paint on red/orange slip, burnished	<750 °C	Floor	Serving	Black paint on red/orange slip (applied with a brush?), appears to be WC finishing (protuberant grains), but unclear
JOR2.H4	JOR2.92	JOR2VI8	Body	CR	N/A	3.5-6.5	Temper?	2 (sieved)		1	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Inside	NO	LHC?	N/A	<750 °C	Disturbed (roots)	N/A	Cylindrical jar? irregular topography (undulating, thinning) + weird microtopo (looks like wet environment but grains are inside, no compactness). Not real evidence of shaving? CHECK
JOR2.E1	JOR2.34	JOR2II6	Body	R?	N/A	6	N/A	3 (Subgroup)		1,2	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside/Inside (some comets)	NO	WC. scraping?	Brown slip, LHC smoothing (outside)	<750 °C	Disturbed (roots)	N/A	Does not look finger scraping, but there are no tool marks and surface topography is regular (different from the other)

MF group	Sherd code	Strati-gra-phy	Vessel part	Shape	(cm)	Wall thick-ness (mm)	Macro-assessment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Posi-tion LC	Equi-dis-tant	Position	Pre-forming	Grain position	Stria-tions	Finishing	Surface treat-ment	Firing T	Context	Pro-posed use	Comments
JOR2.AA3	JOR2.60.1	JOR2V7	Rim	CRD	25	7	Temper?	1		1,1	<body	Outside	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	YES	WC?	Red slip, LHC smoothing	<750 °C	Floor	Serving	Regular topography like the sample above, departs from the previous ones (more energy on fashioning)
JOR2.R1	JOR2.25	JOR2I5	Body	R?	N/A	10	N/A	N/A		1,4	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside/Inside	YES	WC, scraping	Red slip (outsidE), LHC smoothing (much heavier outside, probably caused striations)	<750 °C	Floor	N/A	Regular topography as last samples.
JOR2.M4	JOR2.25.2	JOR2I5	Rim	CC	28	5-8	Sieved/Sorted?	2		1,3	body	Outside	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	YES	WC, scraping	Orange slip (outside+lip inside), LHC smoothing	<750 °C	Floor	Serving	Regular topography, shoudl be JOR2.M3
JOR2.S2(1)	JOR2.3.3	JOR2I5	Body	CC	20	6	Temper?	1		1,2	body	Outside	YES	Oblique (o-i)	Pinching, drawing	Inside	YES	LHC?	Brown slip inside, LHC smoothing?	<750 °C	Upper	Serving	Irregular topo
JOR2.RR4	JOR2.27.S1	JOR2I5	Body	R?	N/A	11-13	Sieved/Sorted?	3		2	N/A	N/A	N/A	Oblique (o-i)	Pinching, drawing or some palmar beating?	Outside/ejected (int)	YES	WC, scraping	N/A	<750 °C	Floor	Cooking/Storage	Disc. pressure visible on ext surface (percussion=grains ejected inside+surface irregularity+subparallel orientation of voids?)
JOR2.CC2	JOR2.76.S1	JOR2IVa6	Body	U	N/A	6	Temper?	3		1,5	N/A	N/A	YES	Oblique (o-i)	Pinching, drawing	Outside	YES	WC, scraping	Barbotine both side, colored inside (should be in macro group 3)	<750 °C	Feature (hearth)	N/A	Rare, no LHC smoothing
JOR2.NN4	JOR2.95.S1	JOR2VII8	Body	U	N/A	15	Sieved/Sorted?	3 (Subgroup)		1,5	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside	YES	WC, scraping	N/A	<750 °C	Feature (clay)	Cooking/Storage	big pot, scraping gestures very clear
JOR2.DD1	JOR2.25.1	JOR2I5	Rim	CR	36	8	Temper?	2		1	<body	Outside	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	YES	WC, brushing?	LHC smoothing (outside), brown slip on lip	<750 °C	Floor	N/A	Very big pot, very compact (but small coils!), only brushing like trace so far

MF group	Sherd code	Strati-gra-phy	Vessel part	Shape	(cm)	Wall thick-ness (mm)	Macro-assessment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Posi-tion LC	Equi-dis-tant	Position	Pre-forming	Grain position	Stria-tions	Finishing	Surface treat-ment	Firing T	Context	Pro-posed use	Comments
JOR2.S3	JOR2.96.4	JOR2VII9	Rim	CRC	20	5	Temper?	2		1	body	Outside	YES	Oblique (o-i)	Pinching, drawing	Inside	YES	Not clear	Brown slip, LHC smoothing, burnishing	<750 °C	Feature (clay)	Serving	Finishing not clear due to erasure of operations by surface treatment
JOR2.S1	JOR2.67	JOR2VI7	Body	R	N/A	10	Temper?	2		1,7	body	Outside	YES	Oblique (o-i)	Pinching, drawing	Outside	YES	WC, scraping, maybe outside also fingers after scraping	Red slip outside	<750 °C	Disturbed (roots)	Cooking/Storage	On this sample is clear that after scraping outer surface is also smoothed in WC with fingers.
JOR2.S2(2)	JOR2.61	JOR2V7	Body	U	N/A	6-9	Temper?	2		1,1	N/A	N/A	YES	Oblique (o-i)	Pinching, drawing	Inside	NO	Not clear	Brown slip, LHC smoothing (both sides)	<750 °C	Floor	Serving	Slip on both sides, should be in macro group 3. Cannot say much about finishing cause the LHC gestures erased the previous.
JOR2.Y3	JOR2.25.5	JOR2I5	Rim	Plate	20	5	N/A	Outlier		0.4-0.7	body	Outside	YES	Oblique (o-i)	Pinching, drawing (very good, hard to see in xsection)		YES	Not clear	Reddish brown slip (negative?) or paint, bands inside, all outside, burnished	<750 °C	Floor	Serving	Bands of reddish brown paint or slip (horizontal, no brush marks) on int surface.
JOR2.FF4(2)	JOR2IVA6	JOR2IVA6	Body	R	N/A	7-13	Temper?	2		2,5	N/A	N/A	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	NO	WC, scraping	LHC smoothing (outside)	<750 °C	Feature (hearth)	Cooking/Storage	Irregular topography, bad pre-forming like many samples here Topography is very regular. The grains inside seem to be related to use-wear (base) and not to LHC smoothing.
JOR2.KK3	JOR2.59.1	JOR2V7	Rim	P	11	5,5	N/A	3		1,2	body	Outside	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	YES	WC, fingers?	Red slip	<750 °C	Floor	Serving	
JOR2.O3	JOR2.63	JOR2V7	Body	CRD	35	10	Temper?	2		0,7	body	Outside	YES	Oblique (o-i), maybe alternate	Pinching, drawing	Outside	YES	WC, fingers & scraping?	Red slip	<750 °C	Floor	Serving	Undulating topography, tool marks, plus finger striations, not a lot of care
JOR2.P3	JOR2.15	JOR2I5	Body	T	25	10,5	Sieved/Sorted?	2		1	body	Outside	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	YES	WC, fingers & scraping?	Slip, LHC smoothing outside (mild!)	<750 °C	Floor	Serving	Undulating topography, tool marks, plus finger striations, not a lot of care

C Rims

Rim Code	U/R	Shape	Wall ∠ (°)	Base ∠ (°)	(cm)	%	Wall (mm)	Rim profile	Rim ∠ (°)	Lip morphology	Comments
JOR2V7.60	U	CRD	75		25	5	7	Direct	75	Thickened, beveled outside	
JOR2V7.59	U	P	30		11	11	5,5	Direct	30	Thinned	
JOR2V7.45(1)	U	CR	90		27	6	8	Incurved	95	Thinned	Flange
JOR2V7.45(2)	R	O	115		13	13	5,5	Excurvated	70	Thickened	
JOR2V7.45(3)	U	CC	60		24	6	6	Direct	60	Thinned, slightly beveled outside	
JOR2V7.45(4)	NI	NI	NI		15	4	5	NI	60	Beveled both sides	
JOR2V7.45(5)	U	CRD	60		21	5	5,5	Direct	60	Flat	
JOR2V7.45(6)	U	CRD	50		12	5	5	Direct	50	Beveled both sides	
JOR2V7.45(7)	NI	NI	NI		35	2	9	NI	90	Thickened, flat	
JOR2III6.30	U	CR	80		15	6	5	Excurvated	55	Slightly flat	
JOR2I6.4	U	CR	85		20	12	7	Incurved	100	Thickened	
JOR2VII9.98	NI	CRD	40		?	?	8	Everted	10	Everted, thinned	
JOR2IV6.68(1)	U	CR/O	80		35	7	11,5	Excurvated	40	Thickened	
JOR2IV6.68(2)	U	CRD	35		25	6	9	Direct	35	Beveled outside	
JOR2IV6.68(3)	U	CR	70		35	3	7	Direct	70	Flat	
JOR2IV6.68(4)	U	CR	85		14	5	5	Incurved	95	Thinned	
JOR2IV6.68(5)	U	CRD	60		20	4	8	Excurvated	40	Slightly everted, beveled outside	
JOR2IV6.68(6)	U	CRD	60		17	7	8	Excurvated	10	Round	
JOR2IV6.68(7)	U	P	20		20	2	7,5	Direct	20	Thickened	
JOR2II5.25(1)	U	CR	90		36	4	8	Slightly excurvated	80	Thickened	
JOR2II5.25(2)	U	CC	70		28	5	8	Slightly incurved	90	Round	
JOR2II5.25(3)	U	CRD	70		20	7	8	Direct	70	Thickened, beveled outside	
JOR2II5.25(4)	R	O	120		13	12	10	Excurvated	40	Round	
JOR2II5.25(5)	U	P	30		20	3	5	Direct	30	Thickened outside	
JOR2II5.25(6)	U	CRD	75		?	?	6,5	Direct	75	Flat	
JOR2II5.25(7)	U	CRD	60		20	5	7	Direct	60	Round	
JOR2II5.25(8)	NI	NI	35		15	3	7,5	NI	35	Round	
JOR2II5.24(1)	R	O	80		20	2	5	Excurvated	100	Thinned	
JOR2II5.24(2)	U	CRD	70		25	2	10	Direct	70	Flat	
JOR2I5.3(1)	U	CRD	40		15	5	9	Direct	40	Thinned	
JOR2I5.3(2)	R	CCC	85		20	7	5,5	Direct	110	Thickened, slighly flat	
JOR2I5.3(3)	U	CC	40		20	3	6	Direct	40	Flat	
JOR2I5.3(4)	R	CRC	95		22	3	6	Direct	95	Round	
JOR2VI7.48(1)	U	CRD	50		20	2	5	Direct	50	Flat	
JOR2VI7.48(2)	R	O	115		4	7	4	Excurvated	50	Round	
JOR2VI7.48(3)	U	CRD	55		30	2	3,5	Direct	55	Thickened, beveled inside	
JOR2III6.34(1)	R	O	100		16	6	7	Excurvated	40	Beveled outside	
JOR2III6.34(2)	U	CRD	70		15	6	10,5	Direct	70	Slightly flat	
JOR2III6.34(3)	R	O	110		9	6	7	Excurvated	80	Round	
JOR2III6.34(4)	R	CCC	140		20	4	5,5	Direct	140	Thickened outside	
JOR2III6.34(5)	U	P	5		15	4	6	Direct	5	Round	
JOR2III6.34(6)	U	P	30	0	15	2	4	Direct	30	Round	
JOR2III6.34(7)	U	NI	NI		4	10	10	Direct	20	Beveled	
JOR2III6.34(8)	U	P	25		30	2	6	Direct	25	Flat	
JOR2III6.34(9)	U	CRD	60		20	4	8	Excurvated	35	Thinned	
JOR2II5.27(1)	U	CR	95		25	9	10,5	Excurvated	60	Round	
JOR2II5.27(2)	U	CRD	75		45	3	8	Direct	75	Thickened outside	
JOR2II5.27(3)	U	CRD	70		42	2	7	Direct	70	Thickened outside	
JOR2II5.27(4)	R	O	100		10	8	6	Excurvated	40	Round	
JOR2II5.27(5)	U	CC	40		25	3	8,5	Direct	40	Round	
JOR2II5.27(6)	U	CRD	60		20	3	6	Direct	60	Round	
JOR2II5.27(7)	U	CC	40		20	3	6	Direct	40	Thickened outside, thinned	
JOR2II5.27(8)	U	CR	80		20	4	6	Excurvated	50	Round	
JOR2IVA6.75	R	CCC	130		35	2	4	Direct	130	Thickened, beveled both sides	
JOR2IVA7.86(1)	R	CCC	100		35	3	7	Direct	100	Thickened outside	
JOR2IVA7.86(2)	U	CRD	70		25	3	6	Direct	70	Beveled outside	
JOR2IVA7.86(3)	U	CRD	60		15	5	9	Direct	60	Round	
JOR2IVA7.86(4)	U	CRD	50		8	5	9	Direct	50	Flat	
JOR2V7.62	U	CR	90		45	5	7	Direct	90	Thickened outside	Flange
JOR2VI8.92(1)	R	O	110		22	10	5	Excurvated	30	Round	
JOR2VI8.92(2)	U	CR	70		40	3	7	Excurvated	30	Thickened, beveled inside	
JOR2VI8.92(3)	U	CC	60		25	2	7	Direct	60	Thickened, beveled outside	
JOR2VI8.92(4)	R	O	95		10	10	5	Excurvated	50	Thickened, slighly flat	
JOR2VI8.92(5)	U	CR	70		30	2	7	Excurvated, slightly ondulating	50	Round	
JOR2VI8.92(6)	U	CRD	80		20	3	7	Vertical	90	Thinned	
JOR2VI8.92(7)	U	CR	65		32	7	7	Excurvated	30	Thickiened, beveled inside	
JOR2VII9.96(1)	U	CR	80		23	7	8	Excurvated	40	Thinned	
JOR2VII9.96(2)	R	O	100		20	4	6	Slightly excurvated	80	Thinned	
JOR2VII9.96(3)	U	CR	80		15	6	6	Excurvated	60	Flat	
JOR2VII9.96(4)	R	CRC	105		20	5	5	Direct	105	Thinned	
JOR2VII9.96(5)	U	CRD	50		15	4	7	Direct	50	Round	
JOR2VII9.96(6)	R	O	115		8	10	7	Excurvated	40	Thinned	
JOR2V7.63	U	CRD			35	10	10	Direct		Round	
JOR2II5.15	U	CCC			25	4	1,5	Direct		Round	

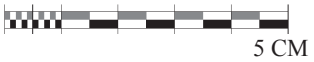
D Decoration & Appendages

MF Group	Sample Code	Part	Incision	Punctuation	Applique	Zoomorphic	Anthropomorphic	Paint	Double slip	Acanaladura	Impression	Comments
JOR2.JJJ3	JO2.68.2	Rim+base+suppport scar	0	1	1	0	0	0	0	1	0	Leon punteado, punctuation at the center of a slightly concave bowl, lip is acanalado, support scar present. Used for chilli grinding?
JOR2.KKK4	JOR2.34.3	Rim	0	0	1	0	0	0	0	0	0	Rim (CR u O) with chipote on the lip (slightly conical)
JOR2.GGG1	JOR2.62	Rim	0	0	1	0	0	0	0	0	0	Applique (maybe lug? but not clear at all) of circular shape, 15mm diam.
JOR2.OO4	JOR2.25	Body (U)	0	0	1	0	0	0	0	0	1	Applied coil perpendicular to base, with circular impressions (5 mm diam, apparently done with a small stick or small fingercreating a sort of rope like effect.
JOR2.PP3	JOR2.45.3	Rim	0	0	1	0	0	0	0	0	0	Applied circle (diam 8 mm). eroded, its flat
JOR2.RR4	JOR2.3	Shoulder	1	0	0	0	0	0	0	0	0	Deep thin (<1mm) incised lines (some parallel, some criss crossing), apparently at the base of the neck of an olla (ext wall)
JOR2.S4	JOR2.45.1	Rim	0	0	1	0	0	0	0	0	0	Applied circle (diam 8 mm). eroded, its flat..maybe same vessel as the other sample above
JOR2.S4	JOR2.39	Handle	0	0	1	0	0	0	0	0	0	Braided handle, made of two coils (1.3-1.4 cm diam)
JOR2.S4	JOR2.25	Support	0	0	1	0	0	0	0	0	0	Cyllindrical support, 1.3 cm diameter, 2cm tall
JOR2.UU2	JOR2.68.1	Rim	0	0	0	0	0	0	0	0	1	Carca rim, rough version, apparently clay was cut with a tool and the marks are irregular (5-7mm)
JOR2.UU4	JOR2.24	Body	1	0	0	0	0	0	0	0	0	Parallel lines (<1mm)
JOR2.UU3	JOR2.45	Body	0	0	0	0	0	0	1	0	0	Red on orange
JOR2.24	JOR2.O4	Body	1	0	0	0	0	0	0	0	0	Deep parallel (<1mm) lines
JOR2.R1	JOR2.25	Body	0	0	0	0	0	1	0	0	0	Reddish brown paint on white slip
JOR2.D4	JOR2.45	Handle	0	0	1	0	0	0	0	0	0	Curved cylindrical coil, JOR2.45
JOR2.E3	JOR2.3	Body	0	0	0	0	0	1	0	0	0	Black paint on red slip\\
JOR2.XX3	JOR2.?	Rim	0	0	0	0	0	1	0	0	0	Black paint on red slip\\
JOR2.II1	JOR2.34.5	Rim+body	0	0	0	0	0	1	0	0	0	Black paint on red slip\\
JOR2.XX20/II3	JOR2.45.5	Rim	0	0	0	0	0	1	0	0	0	Black paint on red slip, two bands below the rim nd one on the lip
JOR1.Y3	JOR2.25.5	Rim	0	0	0	0	0	1	0	0	0	Reddish brown paint on white slip, probably same vessel as JOR2.25 (same bag, same traits), check CATALOGS
JOR2.U4	JOR2.3	Body	1	0	0	0	0	0	0	0	0	Two parallel incised lines (sharp object), 1 mm wide
JOR2.X3	JOR2.30	Rim	0	0	0	0	0	0	0	1	0	Not sure it is classified as acanaladura, different levels achieved probably with a tool,
JOR2.Y1	JOR2.3	Body	0	0	0	0	0	1	0	0	0	Black paint on red slip
JOR2.V4	JOR2.14	Body	1	0	0	0	0	0	0	0	0	Bands of parallel fine incisions (<1mm) with irregular spacing and oblique in relationship to the next band
JOR2.V4	JOR2.27	Body	1	0	0	0	0	0	0	0	0	Parallel ultra fin lines (<0.5mm) with sharp object, parallel to each other but spaced irregularly
JOR2.I2	JOR2.48	Body	0	0	1	0	0	0	0	0	1	Applique consisting of two parallel coils (7mm wide) with circular impressions creating a sort of rope effect (similar to JOR2.OO4/JOR2.25 and UBI1.K3/UBI1CXIII5)
JOR2.M4	JOR2.96	Body	0	0	1	0	0	0	0	0	0	Applied circle (diam 11mm), possibly another applique next to it, not clear if body or base
JOR2.J1	JOR2.34	Body	1	0	0	0	0	0	0	0	0	Two parallel incised lines (sharp object), 1 mm wide, internal wall
JOR2.NA	JOR2.48	Body	0	0	0	0	0	1	0	0	0	Black paint on red slip, super small fragment
JOR2.X21	JORS.3.S1	Base	0	1	0	0	0	0	0	0	0	Several punctuation internal wall of the vessel (3x1.5mm)
JOR2.X18	JOR2.25	Body	0	0	1	0	0	0	0	0	0	Applied circle (9mm diam)
JOR2.X22	JOR2.27	Body	1	0	0	0	0	0	0	0	0	Thin parallel bands of thin incised lines (<1mm), oblique to each other
JOR2.GGG1	JOR2.62	Body	0	1	1	0	0	0	0	0	0	Chipote applique with punctuation in the middle on outer surface. Red slip band on lip
Totals			**8**	**3**	**13**	**0**	**0**	**8**	**1**	**2**	**3**	

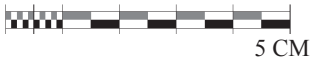
JOR2

5 CM

JOR2



JOR2



Appendix 11

Oporta ceramic analysis

A Macrofabric

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Organic	Fre-quency	Sorting	Round-ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Fracture	Feel	Inducti on1 (grs)	Inducti on2 (grs)	Inducti on3 (grs)	Inducti on4 (grs)
OP1.A	Very coarse - Coarse	1	1	0	0	1	1	0	1	0	20%	MS	LS	Veryangular/Subangular/Subrounded	Subparallel/Chaotic	Plate/Oval-sphere/Irregular	Oblique/Chaotic	2-12	H	Fine	Harsh/Rough	83,3	0	20,1	0
OP1.B	Very coarse - Medium	1	0	1	1	1	1	0	1	0	20-25%	MS	LS	Angular/Subangular/Subrounded/Rounded	Subparallel/Chaotic	Plate/Irregular	Subparallel/Horizontal/Oblique	2-10	H	Smooth/Fine/Laminated	Rough	56,4	0	17,4	34
OP1.C	Very coarse - Coarse	1	0	1	0	1	1	0	1	0	30%	MS/PS	LS	Veryangular/Angular/Subangular/Subrounded	Subparallel/Chaotic	Plate/Irregular	Subparallel/Chaotic	2	H	Fine/Irregular/Hackly	Rough	144,7	0	3,9	0
OP1.D	Very coarse - Medium	1	1	1	0	1	1	0	1	0	20-25%	MS	LS	Angular/Subangular/Subrounded	Chaotic	Plate/Irregular	Subparallel/Chaotic	2-4-14	H	Fine/Irregular/Hackly	Rough	40,4	0	37,2	0
OP1.E	Very coarse - Medium	1	1	1	0	1	1	0	1	1	20%	MS	HS/LS	Angular/Subangular/Subrounded/Rounded/Flat	Oblique/Concentric/Chaotic	Irregular	Subparallel/Chaotic	2	H	Fine/Hackly	Smooth	13,2	0	35,8	8,6
OP1.F	Very coarse - Medium	1	1	0	0	0	1	0	1	0	20%	MS	HS	Angular/Subangular/Subrounded	Chaotic	Irregular	Subparallel/Chaotic	8-12	H	Irregular/Hackly	Rough	47,3	0	0	31,4
OP1.G	Granule - Medium	1	1	1	0	1	1	0	0	0	20-25%	PS	LS	Veryangular/Angular/Subangular/Subrounded	Subparallel/Oblique/Chaotic	Oval-sphere/Irregular	Chaotic	2-10	H	Fine/Hackly	Smooth	4,4	2,9	28,6	31
OP1.H	Granule - Coarse	1	1	1	0	1	1	0	1	0	25-30%	PS	HS/LS	Veryangular/Angular/Subrounded/Rounded/Flat	Subparallel/Concentric/Chaotic	Irregular	Subparallel/Chaotic	4-8-10	H	Fine/Hackly/Laminated	Smooth	0	0	39,1	13,1
OP1.I	Granule - Coarse	1	1	1	0	1	1	0	1	0	>30%	MS	HS/LS	Veryangular/Angular/Subrounded/Flat	Oblique/Chaotic	Plate/Irregular	Subparallel	2	H	Fine/Hackly/Laminated	Smooth	0	0	27,4	0
OP1.J	Coarse - Fine	1	1	1	0	1	1	0	1	0	15%	MS	HS	Subangular/Subrounded/Rounded/Irregular/Flat	Subparallel/Chaotic	Plate/Irregular	Subparallel/Oblique/Chaotic	1	H	Fine/Irregular/Hackly	Powdery	152,9	19	0	35,5

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Organic	Fre-quency	Sorting	Round-ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Fracture	Feel	Induction1 (grs)	Induction2 (grs)	Induction3 (grs)	Induction4 (grs)
OP1.K	Medium - Fine	1	1	0	1	1	1	0	0	0	15-20%	WS	HS	Subangular/Subrounded	Subparallel/Concentric	Oval-sphere/Irregular	Oblique/Chaotic	9	H	Smooth/Fine	Smooth	0	0	12,4	2,1
OP1.L	Coarse	1	1	0	0	1	1	0	1	0	20%	PS	LS	Angular/Subangular/Subrounded/Flat	Subparallel/Oblique/Concentric/Chaotic	Plate/Irregular	Concentric/Chaotic	2-4-8	H	Smooth/Fine/Hackly	Rough	9,6	5,9	17,9	21,8
OP1.M	Coarse - Medium	1	0	0	1	1	0	0	0	0	25%	WS	HS	Subangular/Subrounded/Flat	Subparallel/Chaotic	Plate	Parallel	2-10	H	Smooth/Fine	Smooth	5,2	0	0	16
OP1.N	Very coarse - Medium	1	0	0	0	1	1	0	1	0	20%	MS	HS	Subangular/Subrounded	Subparallel/Oblique/Chaotic	Plate/Oval-sphere/Irregular	Subparallel/Chaotic	2-12	H	Smooth/Fine	Smooth	11,3	0	19,8	2
OP1.O	Granule - Medium	1	1	0	0	1	1	0	1	0	20-25%	MS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Concentric/Chaotic	Plate/Irregular	Subparallel/Chaotic	2-4-10-12	H	Fine/Irregular/Hackly	Rough	32,2	21,1	58,1	38,3
OP1.P	Very coarse - Coarse	1	1	0	1	1	1	0	1	0	25-30%	MS	HS	Subrounded/Rounded	Oblique/Chaotic	Plate/Irregular	Subparallel/Chaotic	2-4-10-16-18	H	Irregular/Hackly/Laminated	Rough	53	19,7	31,4	87
OP1.Q	Coarse - Medium	1	1	1	1	0	1	0	1	0	20-25%	MS	LS	Subangular/Subrounded/Flat	Subparallel/Concentric	Plate/Oval-sphere/Irregular	Parallel/Concentric/Chaotic	2	H	Irregular/Hackly	Rough	0	0	0	16,6
OP1.R	Very coarse - Coarse	1	0	1	1	1	1	0	0	0	20%%	MS	LS	Subangular/Subrounded	Subparallel/Chaotic	Plate/Oval-sphere	Oblique/Chaotic	2	H	Fine/Irregular/Hackly	Rough	4,7	4,6	14,7	0
OP1.S	Very coarse - Coarse	1	0	1	0	1	1	0	1	0	15-20%	MS	HS	Angular/Subrounded/Rounded	Subparallel/Oblique/Chaotic	Plate/Oval-sphere/Irregular	Oblique/Chaotic	8	H	Irregular/Hackly	Rough	0	9	3,4	9,9
OP1.T	Granule - Very coarse	1	0	1	1	1	1	0	0	0	20-25%	PS	HS	Angular/Subrounded/Rounded	Concentric/Chaotic	Oval-sphere/Irregular	Chaotic	2	H	Irregular/Hackly	Smooth	2,7	16,2	2,3	0
OP1.U	Granule - Coarse	1	0	1	1	1	1	0	1	0	>30%	PS	LS	Angular/Subangular/Subrounded/Rounded/Flat	Parallel/Concentric	Plate/Oval-sphere/Irregular	Subparallel/Chaotic	2-12	S	Irregular/Hackly	Rough	4,7	0	12,6	20,4
OP1.V	Very coarse - Coarse	1	1	1	0	1	1	0	1	0	20%	MS	HS	Subangular/Subrounded/Rounded	Subparallel/Oblique	Plate/Irregular	Horizontal/Oblique	2-10-20	H	Irregular/Hackly	Smooth	19,4	0	18,3	4,5

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Organic	Fre-quency	Sorting	Round-ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Fracture	Feel	Inducti on1 (grs)	Inducti on2 (grs)	Inducti on3 (grs)	Inducti on4 (grs)
OP1.W	Coarse - Very fine	1	1	1	0	1	0	0	1	0	15%	MS	HS	Subangular/Subrounded/Rounded/Irregular	Subparallel/Chaotic	Plate/Irregular	Subparallel/Chaotic	1-17-19	H	Smooth/Fine	Rough	0	0	5,7	21
OP1.Y	Medium - Fine	1	0	0	0	1	1	0	1	0	25%	MS	HS	Angular/Subangular/Subrounded	Oblique/Concentric/Chaotic	Plate/Irregular	Subparallel/Chaotic	1-3	H	Fine/Hackly	Smooth	101,8	0	29,1	16,2
OP1.Z	Very coarse - Fine	1	0	0	0	1	1	0	0	0	20%	MS	HS	Angular/Subangular/Subrounded	Oblique	Oval-sphere/Irregular	Oblique/Chaotic	8-18	H	Fine/Hackly	Smooth	13,6	6,6	7,3	0
OP1.AA	Fine - Very fine	1	0	0	1	0	1	0	1	1	10%	VWS	HS	Subrounded	Subparallel/Concentric/Chaotic	Plate/Oval-sphere	Subparallel	1	S	Smooth/Fine	Smooth	2,6	0	0	7,5
OP1.BB	Very fine - Silt	1	0	0	0	0	1	0	1	0	10%	VWS	HS	Subangular/Subrounded	Chaotic	Oval-sphere/Irregular	Subparallel/Chaotic	9	H	Smooth/Fine	Rough	6,9	0	8	0
OP1.CC	Coarse - Medium	1	1	1	0	1	1	0	1	0	25-30%	MS	HS	Angular/Subangular/Subrounded/Irregular	Subparallel/Oblique/Chaotic	Plate/Irregular	Oblique/Chaotic	2	H	Irregular/Hackly	Smooth	23,8	2,9	0	14,3
OP1.DD	Coarse - Medium	1	1	1	0	1	1	0	1	0	20-25%	WS	HS	Subangular/Subrounded/Rounded/Irregular	Subparallel/Chaotic	Plate/Oval-sphere	Subparallel/Oblique	2	H	Smooth/Irregular	Rough	0	0	0	12
OP1.FF	Coarse - Medium	1	1	1	0	1	1	0	1	0	25%%	PS	LS	Veryangular/Angular/Subangular/Subrounded/Irregular	Oblique/Chaotic	Oval-sphere/Irregular	Subparallel/Horizontal/Chaotic	2-4-14	H	Fine/Irregular/Hackly	Smooth	68,1	28,6	25	55,5
OP1.GG	Coarse - Medium	1	1	1	0	1	1	0	1	0	20%	MS	HS	Angular/Subangular/Subrounded/Irregular	Oblique/Concentric/Chaotic	Plate/Oval-sphere/Irregular	Parallel/Subparallel/Chaotic	2-4	H	Fine/Irregular/Hackly	Rough	9,1	1,6	14	4,2
OP1.HH	Coarse - Medium	1	0	1	0	1	1	1	1	0	20-25%	MS	HS	Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate/Oval-sphere	Subparallel/Oblique	2	H	Irregular/Hackly/Laminated	Rough	21	0	0	0
OP1.II	Coarse - Medium	1	1	0	1	0	1	0	1	0	30->30%	VWS	LS	Veryangular/Angular/Subangular/Subrounded	Subparallel/Oblique	Plate/Oval-sphere	Subparallel/Oblique	2-8-12-18	H	Fine/Hackly	Smooth	23,3	0	214,4	0

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Organic	Fre-quency	Sorting	Round-ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Fracture	Feel	Induction1 (grs)	Induction2 (grs)	Induction3 (grs)	Induction4 (grs)
OP1.LL	Medium	1	1	0	0	0	1	0	1	0	20-25%	WS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Concentric	Plate/Oval-sphere	Subparallel/Oblique/Concentric	4-10	H	Smooth/Fine	Smooth	0	0,7	13,9	0
OP1.MM	Coarse - Medium	1	1	0	0	1	1	0	1	0	30->30%	WS	HS	Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate/Oval-sphere	Subparallel/Horizontal	8	S/H	Irregular/Hackly	Rough/Powdery	36	96,7	0	34,1
OP1.NN	Coarse - Medium	1	0	0	0	1	1	0	0	0	25-30%	MS	HS	Angular/Subangular/Subrounded/Rounded/Irregular	Subparallel/Concentric/Chaotic	Plate/Oval-sphere/Irregular	Subparallel/Oblique/Concentric/Chaotic	2-4	S	Smooth/Irregular/Hackly	Powdery	0	16	0	46,5
OP1.OO	Coarse - Medium	1	0	0	0	1	1	0	1	0	20-25%	MS	HS	Angular/Subangular/Subrounded/Irregular	Chaotic	Plate/Oval-sphere/Irregular	Subparallel/Chaotic	2-4	H	Fine/Irregular/Hackly	Smooth/Powdery	2,7	0	1,3	0
OP1.PP	Coarse - Medium	1	0	1	0	0	1	0	1	0	30%	MS	HS	Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate	Subparallel/Horizontal/Oblique/Concentric	2	VH	Smooth/Fine	Rough/Powdery	0	0	48,3	10,6
OP1.QQ	Very coarse - Medium	1	1	1	0	1	1	0	0	0	20%	MS	HS	Veryangular/Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate/Oval-sphere	Subparallel/Oblique/Chaotic	2-18	H	Smooth/Fine	Rough	4,3	0	19,8	9,1
OP1.RR	Coarse - Medium	1	0	1	0	1	1	0	1	0	20-25%	MS	HS	Angular/Subangular/Subrounded/Irregular	Subparallel/Oblique/Chaotic	Oval-sphere/Irregular	Oblique/Chaotic	2	H	Irregular/Hackly	Rough/Powdery	46,3	0	0	3,4

B Macrotrace (petro)

MF group	Sherd code	Strati-graphy	Vessel part	Shape	(cm)	Wall thickness (mm)	Macro-assessment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equi-distant	Position	Pre-forming	Grain position	Striations	Finishing	Surface treatment	Firing T	Context	Proposed use	Comments
OP1.J1	OP1B.172	OP1BVII M5	Body	O?	N/A	11	N/A		Coarse - Fine	5	2	N/A	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	NO (but some tool marks maybe inside, possibly scalloped outside)	WC inside, LHC (shaving?) outside	Brown slip, LHC smoothing outside	<750 °C	on-mound	Storage	Surface topography is extremely irregular, first assumption was palmar beating, but orientation of the grains is not parallel to the walls, it concentric (coiling).palmar pressure with the other hand as support, or shaving
OP1.C1	OP1.66	OP1AIII A4-5	Body	N/A	N/A	6,5	Tempered	Outlier	Very coarse - Coarse	1,5	N/A	N/A	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	YES (inside)	WC (scraping?)	Orange slip, LHC smoothing (heavier outside)	<750 °C	off-mound	N/A	Surface topography is also irregular, not as sample OP1.172 but also
OP1.II3	OP1.10.1	OP1AIII 4	Rim	CRD	20	5	Tempered		Coarse - Medium	1,3	body	Inside	N/A	Oblique (o-i)	Pinching, drawing	Outside/Inside	YES	WC (fingers?)	Red slip, LHC outside	<750 °C	off-mound	Serving	Surface topography is regular
OP1.F1	OP1.159	OP1BXX 4	Body	R	N/A	10	Tempered		Very coarse - Medium	3	2,5	N/A	YES	Oblique (i o)	Pinching, drawing	Outside/Inside	YES	WC, soft tool?	Brown slip, mild LHC smoothing outside	<750 °C	off-mound	Cooking/storage	Smoked inside, interesting cross-section, voids follow gestures, formally similar to OP1B.172, but technologically different
OP1.II3	OP1.85	OP1AVII 5	Body	U	N/A	7	Tempered	Outlier	Coarse - Medium	1,6	N/A	N/A	N/A	Oblique (o-i)	Pinching, drawing	Outside/Inside	NO (could have, but erased by later gestures)	WC	Brown slip,LHC	<750 °C	off-mound	Serving	Outside decoration: clay balls (6-8mm ø) with a punctuation (done in LHC) in the middle. Surfaces are shiny, but no burnishing, it's also on the fractures! DIFFERENT: SLIP APPLIED ON PROTUBERANT GRAINS!
OP1.B1	OP1.169.S1	OP1AVII M5	Body	R?	N/A	7	Tempered		Very coarse - Medium	4	2,4	N/A	N/A	Oblique (i o)	Pinching, drawing	Inside	YES	LHC (shaving?)	Brown slip or barbotine	<750 °C	on-mound	Serving/Storage	Surface topography is irregular, clear LHC finishing
OP1.E3	OP1.62.1	OP1AIIA 4	Rim	O	23	5	Tempered	Outlier	Very coarse - Medium		1	body	Outside	Oblique (o-i)	Pinching, drawing	Outside/Inside	YES (mainly on burnished lip)	N/A (erased)	Slip (brown band on lip + int\), LHC, burnished (only lip)	<750 °C	off-mound	Cooking/storage	Joyce says its Santa Barbara (Ulua Valley), incision gesture: from down to up
OP1.C1	OP1A.48	OP1AIII 4	Body	R?	N/A	15	Tempered		Very coarse - Coarse	6	1,6	N/A	N/A	Oblique (o-i)	Pinching, drawing	Outside/Inside	NO	WC (scraping?)	Brown slip on LHC smoothing	<750 °C	off-mound	Storage	Looks like scraping and later LHC smoothing... not consistent with the rest, so check! Surface topography is irregular, so it could be shaving on a wetter clay? Grains are outside but also inside (confusing if it is a later gesture)
OP1.DD4	OP1.169.3	OP1AVII M5	Rim	O/CRD	15	7	Tempered	Outlier	Coarse - Medium		1,4	body	Outside	Oblique (o-i)	Pinching, drawing	Outside	YES	WC (soft tool?)	Eroded	<750 °C	on-mound	N/A	Too eroded to interpret, Joyce says looks Cocal
OP1.LL3	OP1.85.1	OP1AVII 5	Rim	CRD	30	4	Tempered	Outlier	Medium		1,1	<body	Inside	YES	Oblique (i o)	Pinching, drawing	Inside	NO	N/A (erased)	Black(paint)/Red slip, LHC smoothing	<750 °C	off-mound	Serving	Black paint on red (check with Sulaco valley materials at JOR), black paint on lip in the inside and rim on the outside. LHC surface treatment erased pre-forming traces.
OP1.A1	OP1.169.2	OP1AVII M5	Rim+body	O	16	9	Related to OP1.D		Very coarse - Coarse	6	1,5	body	Outside	N/A	Oblique (o-i)	Pinching, drawing	Outside/Inside	YES	WC (scraping?)	Brown slip outside, LHC smoothing both sides (till hand reach), burnishing outside	<750 °C	on-mound	Cooking/storage	Fire mark on the outside (body), surface topography is irregular, voids subparallel to the wall, hard to see coils. Looks like a Carca rim
OP1.J2	OP1.85.S1	OP1AVII 5	Base	N/A	N/A	7	N/A		Coarse - Fine	1.3-5	1.5	N/A	N/A	N/A	Oblique (i o)	Pinching, drawing	Outside/Inside	YES	WC (scraping or fingers)	LHC smoothing outside (inside there is NO slip, its post-depositional)	<750 °C	off-mound	N/A	Should be on OP1.J4, no slip. Base with spiral coiling, walls seem thicker than base. Circular finger(most likely) gestures
OP1.P2	OP1.139.2	OP1BXII 3	Rim	O?	17	8	N/A		Very coarse - Coarse	2	1,6	N/A	Outside	N/A	N/A	Pinching, drawing	Outside/Inside	NO	WC (no traces)	Brown slip outside, LHC smoothing outside	<750 °C	off-mound	Cooking/storage	Carca rim, muddy paste, incision with vertical gesture (up to down), WC finishing not established, no striations
OP1.G4	OP1A.32.S1	OP1AIII 4	Base+support	N/A	N/A	4,5	Tempered	Outlier	Granule - Medium		0,8	N/A	N/A	N/A	N/A	Pinching, drawing	Outside/Inside	YES	WC (scraping)	Some LHC smoothing, mild	<750 °C	off-mound	N/A	Buttom support (18mm diam), striations around it, circular finger gestures for adding the part. Irregular surface topography. Spiral coiling?
OP1.H3	OP1.46	OP1AII4	Body	O?	N/A	6	Tempered		Granule - Coarse		1,5	N/A	N/A	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	NO	WC (scraping)	Reddish brown slip, LHC smoothing	<750 °C	off-mound	Cooking/storage	Clear tool marks + remmanent protuberant grains = scraping!
OP1.MM4	OP1.32.1	OP1AIII 4	Rim	O	10	6	Sinc		Coarse - Medium	2	1	N/A	Inside	N/A	N/A	Pinching, drawing	Outside	NO	WC	N/A	<750 °C	off-mound	Cooking/storage	Carca rim, 2 fragments, same stratigraphy
OP1.FF4	OP1.65.1	OP1AIIB 4/5	Rim	CRD	22	9	Tempered		Coarse - Medium	3	1-1.8	<body	Outside	N/A	Oblique (o-i)	Pinching, drawing	Outside	YES	WC (scraping, fingers)	N/A	<750 °C	off-mound	Cooking/storage	Irregular topography
OP1.K3	OP1.85.3	OP1AVII 5	Rim	CRD	16	4,5	N/A		Medium - Fine	4	1,5	body	Outside	N/A	Oblique (i o)	Pinching, drawing	Inside	NO	WC? (erased)	Brown slip outside, red slip inside, LHC smoothing	<750 °C	off-mound	Serving	Some grains seems to have been protuberant but then smoothed in LHC=WC finishing=irregular topography (clay removal)=scraping?

MF group	Sherd code	Strati-graphy	Vessel part	Shape	(cm)	Wall thickness (mm)	Macro-assessment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equi-distant	Position	Pre-forming	Grain position	Striations	Finishing	Surface treatment	Firing T	Context	Proposed use	Comments
OP1.MM2	OP1B.140.S1	OP1BXII 3	Body	MLC	N/A	7	Tempered		Coarse - Medium 2	1,5	N/A	N/A	YES	Oblique (i o)	Pinching, drawing	Outside/Inside	YES	WC	LHC smoothing inside or use-wear?	<750 °C	off-mound	Cooking/storage	Smoked inside, incisions (soft, long, sub-parallel lines). Striations typical of OP1 are on the LHC smoothed side... makes the rest suspicious=this can actually be use-wear from the base!!!!
OP1.P3	OP1.36	OP1AIII 4	Body	CRD?	N/A	9,5	N/A	Outlier	Very coarse - Coarse	1,6	N/A	N/A	YES	Oblique (i o)	Pinching, drawing	Outside/Inside	NO	WC	Brown slip, LHC inside, burnished inside	<750 °C	off-mound	Cooking/storage	Good pre-forming, coils hardly visible, excellent surface treatment inside (smoked)
OP1.Y3	OP1.169.1	OP1AVII M5	Rim	CRC	35	8	Tempered		Medium - Fine 4	1,5	body	Outside	N/A	Oblique (o-i)	Pinching, drawing	Inside	YES	LHC (shaving?)	LHC smoothing	<750 °C	on-mound	Serving/Storage	Did not notice slip, check macro-f group code. Surface treatment (LHC) erased pre-forming operations
OP1.L3	OP1.139.1	OP1BXII 3	Rim	O	6	5	Tempered	Outlier	Coarse	1.3-1.5	body	Outside	N/A	Oblique (o-i)	Pinching, drawing	Inside	YES (from LHC burnishing)	LHC (shaving?)	Brown and red slips, burnished	<750 °C	off-mound	Cooking/storage	Nice coil junctures at neck and between body and neck
OP1.II3	OP1.152.2	OP1BXI X4	Rim	CC	25	6	Tempered		Coarse - Medium 1	1-1.2	body	Inside	YES	Oblique (i o)	Pinching, drawing	Outside/Inside	YES	WC	Red slip, LHC smoothing	<750 °C	off-mound	Serving	Seems that lip area lost slip, there you can see grains outside and striations (WC finishing?)

C Rims

Rim Code	U/R	Shape	Wall ∠ (°)	Base ∠ (°)	(cm)	%	Wall (mm)	Rim profile	Rim ∠ (°)	Lip morphology	Comments
OP1BXXI5.85	U	CRD	75		50	2	6	Direct	75	Round	
OP1AII4.45(1)	U	CRD	60		12	9	5	Direct	60	Thickened Inside	
OP1AII4.45(2)	U	NI	NI		18	3	5	Outflaring straight	30	Round, slightly beveled inside	
OP1AIIB4/5.65	U	CRD	65		22	4	9	Direct	65	Round	
OP1BXM6.190	U	CC	50		13	3	6	Direct	50	Beveled outside	
OP1AVII5.85(1)	U	CRD	60		30	2	4	Direct	60	Round	
OP1AVII5.85(2)	U	CRD	70		6	14	2	Direct	70	Thickened & beveled outside	Incised
OP1AVII5.85(3)	U	CRD	65		16	4	4,5	Slightly inward	80	Slightly flat	
OP1AVII5.85(4)	U	CRD	60		18	3	5	Direct	60	Round	
OP1AVII5.85(5)	R	O	110		7	5	5	Excurvated	90	Round	
OP1XIIB2.127	U	CRD	65		21	3	7	Direct	65	Round	
OP1BXIX4.152(1)	NI	NI	NI		32	3	9	Excurvated	40	Round	
OP1BXIX4.152(2)	U	CC	70		25	7	6	Direct	95	Thickened outside	
OP1BXIX4.152(3)	U	CC	65		10	5	6	Direct	65	Round	
OP1BXIX4.152(4)	R	O	110		8	4	3	Excurvated	85	Thickened inside	
OP1BXII3.139(1)	R	O	120		6	14	5	Excurvated	40	Slightly everted	
OP1BXII3.139(2)	NI	O?	90		17	4	8	Excurvated	40	Round	
OP1BXII3.132	U	CRD	60		23	3	8	Direct	60	Flat	
OP1AIIA4.62(1)	R	O	100		23	3	5	Excurvated	70	Thickened inside	
OP1AIIA4.62(2)	U	P?	50		30	3	13	Direct	50	Thinned outside	
OP1AIIA4.62(3)	U	CRD	60		14	5	5	Direct	60	Thickened	
OP1AIIA4.62(4)	U	CC	60		10	5	4	Incurved	110	Round	
OP1AIIA4.62(5)	NI	NI	60		23	5	4	Excurvated	30	Round	
OP1AVIIM5.169(1)	R	CRC	120		35	5	8	Direct	120	Beveled outside	
OP1AVIIM5.169(2)	NI	O	80		16	6	9	Excurvated	30	Thinned	
OP1AVIIM5.169(3)	NI	NI	70		15	4	7	Excurvated	30	Slightly everted	
OP1AVIIM5.169(4)	NI	NI	NI		13	4	8	Direct	40	Thickened outside	
OP1AVIIM5.169(5)	U	CR	90		30	3	8	Direct	90	Thickened, slightly flat	
OP1AVIIM5.169(6)	U	CR	95		22	3	9	Excurvated	40	Thinned	
OP1AIII4.10	R	O	100		34	5	6	Vertical	90	Thickened outside	
OP1A.10.1	R	CCC?	120		22	6		Vertical	120	Thickened outside, flat	
OP1AIII4.32(1)	R	O	115		10	6	6	Excurvated	50	Round	
OP1AIII4.32(2)	R	O	120		15	5	5	Excurvated	40	Round	
OP1AIII4.32(3)	U	CR	95		6	6	6	Direct	95	Round	
OP2V1.6(1)	U	CRD	70		16	6	5	Excurvated	40	Thickened inside	
OP2V1.6(2)	R	CRC	120		9	10	5	Direct	120	Round	
OP2V1.6(3)	U	CR	80		28	4	11,5	Excurvated	50	Thinned	
OP2V1.6(4)	U	CRD	70		20	5	6	Excurvated	50	Round	
OP2V1.6(5)	U	CRD	70		14	6	5	Direct	70	Thickened	
OP2V1.6(6)	U	CRD	75		22	5	6	Direct	75	Slightly flat	
OP2V1.6(7)	U	CRD	65		30	3	9	Direct	65	Round	
OP2V1.6(8)	U	CR	85		31	5	4	Direct	85	Thickened inside, beveled outside	
OP2V1.6(9)	R	O	100		29	5	8	Excurvated	40	Beveled outside	
OP2V1.6(10)	NI	NI	90		25	5	8	NI	55	Beveled inside	
OP2V1.6(11)	R	O	115		20	2	6	Excurvated	70	Thickened & thinned tip	
OP2V1.6(12)	U	CRD	60		13	4	5	Direct	60	Thinned	
OP2V1.6(13)	U	CR	85		4,5	11	2	Outflaring straight	40	Slightly everted, beveled ourside	
OP2III2.47(1)	R	CRC	140		25	4	6	Direct	140	Thinned	
OP2III2.47(2)	R	O	115		20	3	8	Excurvated	70	Beveled inside	
OP2III2.47(3)	R	O	110		14	3	7	Excurvated	60	Thinned, beveled outside	

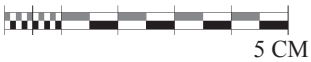
Rim Code	U/R	Shape	Wall ∠ (°)	Base ∠ (°)	(cm)	%	Wall (mm)	Rim profile	Rim ∠ (°)	Lip morphology	Comments
OP2III2.47(4)	U	CRD	80		16	5	3	Direct	80	Thickened	
OP2V2.24(1)	R	O	15		20	9	6,5	Excurvated	40	Thinned	Carca
OP2V2.24(2)	R	O	100		18	3	5	Excurvated	60	Thinned	
OP2V2.24(3)	NI	NI	NI		18	7	6	NI	40	Round	
OP2I1.8(1)	U	CR	80		15	4	8	Direct	80	Slightly flat	
OP2I1.8(2)	U	CR	80		20	7	8,5	Direct	80	Slightly flat	
OP2V2.25(1)	NI	NI	60		30	2	10	NI	60	Thinned	Carca?
OP2V2.25(2)	NI	NI	NI		16	3	6,5	Excurvated	40	Thinned outside	
OP2V2.25(3)	U	CRD	90		26	3	6	Excurvated	70	Beveled inside	
OP2V2.25(4)	R	O	110		28	4	8	Excurvated	35	Thinned, beveled outside	Carca
OP2V2.25(5)	U	CRD	90		33	2	11	Excurvated	40	Thinned	
OP2VI2.31	U	CR	90		15	7	5	Outflaring straight	70	Round	
OP2IX3.66(1)	R	O	105		20	12	6	Excurvated, everted	30	Everted, thinned	Carca
OP2IX3.66(2)	R	CCC	100		21	3	5	Incurved	120	Round	
OP2IX3.66(3)	U	CR	80		8	9	5,5	Excurvated	30	Round	
OP2IX3.66(4)	U	CR	90		19	3	7	Direct	90	Slightly flat, beveled outside	
OP2IE2.25(1)	U	CRD	80		12	7	7	Direct	80	Flat	
OP2IE2.25(2)	U	CRD	60		36	2	6	Direct	60	Thickened & beveled inside	
OP2VIII2.46	U	CRD	80		25	10	8	Excurvated (slightly)	70	Round	

D Decoration & Appendages

MF Group	Sample Code	Part	Incision	Punctuation	Applique	Zoomorphic	Anthropomorphic	Paint	Acanaladura	Impression	Comments
OP1.E1	OP1.31	Base	0	0	1	0	0	0	0	0	Very small base fragment with apparent annular base (6 mm diam)
OP1.E3	OP1.62.1	Rim	1	0	0	0	0	0	0	0	Incised lines oblique to the rim and below it, one large oblique line and several smaller perpendicular to that one (width <1mm)
OP1..F4	OP1.1.S2	Body	1	0	0	0	0	0	0	0	Long parallel lines (<1mm), smoked inside
OP1.G4	OP1.32.S1	Base	0	0	1	0	0	0	0	0	Buttom support
OP1.G4	OP1.52	Body	1	0	0	0	0	0	0	0	Line (<1mm wide)
OP1.G1	OP1.85	Base?	0	0	1	0	0	0	0	0	Possible support or annular base, unclear due to fragmentation
OP1.G4	OP1.62.1	Base	0	0	1	0	0	0	0	0	Base with the scar of a support
OP1.G4	OP1.40	Base	0	0	1	0	0	0	0	0	Base with conical support (11 mm diameter wide part, 3mm point)
OP1.G4	OP1.18	Base	0	0	1	0	0	0	0	0	Base with buttom support
OP1.G2	OP1.77	Body	1	0	0	0	0	0	0	0	1mm wide line incisions, oblique
OP1.H3	OP1.85	Base	0	0	1	0	0	0	0	0	Base with support scar
OP1.I3	OP1.85/OP1.90	Body	0	1	1	0	0	0	0	0	Applique balls (6-9mm diam) on external surface with a 3mm punctuation in sort of the center (not all)
OP1.I3	OP1.93	Body	0	1	1	0	0	0	0	0	Very small sherd, but an applique is visibile, 7x4mm 2mm wide oval shaped applique with 3 punctuated dots on top
OP1.J4	OP1.84	Base	0	0	1	0	0	0	0	0	Aparent spport, shape is undetermined, too fragmented and eroded to describe
OP1.J4	OP1.85	Base	0	0	1	0	0	0	0	0	Aparent spport, shape is undetermined, too fragmented and eroded to describe
OP1.J4	OP1.102	Base	0	0	1	0	0	0	0	0	Aparent spport, shape is undetermined, too fragmented and eroded to describe
OP1.J4	OP1.85	Body	0	0	0	0	0	0	1	0	5mm wide, too fragmented to say more
OP1.K4	OP1.85.2	Rim	1	0	0	0	0	0	0	0	<1mm line oblique to rim
OP1.L4	OP1.27.1/OP1.32.1	Rim	0	0	0	0	0	0	0	1	Carca rim, 5x4mm impressions, <2mm high)
OP1.N3	OP1.132	Body	0	0	0	0	0	1	0	0	Orange paint on red slip
OP1.O4	OP1.40	Body	1	0	0	0	0	0	0	0	Parallel lines, <1mm wide, deeper than the others
OP1.O4	OP1.159	Body	1	0	0	0	0	0	0	0	Parallel lines, <1mm wide
OP1.P2	OP1.139.2	Rim	0	0	0	0	0	0	0	1	Carca rim, 7x4mm impressions, <2mm high)
OP1.Q4	OP1.52	Body	1	0	0	0	0	0	0	0	Bands of parallel incisions (oblique to each other) of <1mm wide, dond with a sharp tool
OP1.S2	OP1.159	Body	1	0	0	0	0	0	0	0	Parallel lines of <1mm wide
OP1.T2	OP1.159	Body	1	0	0	0	0	0	0	0	Parallel lines of <1mm wide
OP1.Y1	OP1.61	Handle	0	0	1	0	0	0	0	0	Handle built with one coil, oval shape, thinned extremes
OP1.Z2	OP1.152	Body	1	0	0	0	0	0	0	0	Bands of parallel incisions (oblique to each other) of <1mm wide, dond with a sharp tool
OP1.AA1	OP1.176	Body	1	0	1	0	0	0	0	0	Applique with incisions on top, only sherd with salmon section (internal surface), light gray (external surface)
OP1.FF3	OP1.184	Body	0	0	0	0	0	1	0	0	Black paint on red slip, similar to JOR2.X20.4!!! (ext)
OP1.FF4	OP1.52	Body	1	0	0	0	0	0	0	0	Wide (2.2 mm) arching incisions
OP1.FF4	OP1.52	Body	1	0	0	0	0	0	0	0	Parallel thin lines (<1mm)
OP1.LL3	OP1.85.1	Rim	0	0	0	0	0	1	0	0	Black paint on red slip (ext)
OP1.MM2	OP1.139-140	Body	1	0	0	0	0	0	0	0	Thin parallel incised lines, but eroded so almost imperceptible
OP1.MM2	OP1.102	Body	1	0	0	0	0	0	0	0	Thin parallel incised lines, but eroded so almost imperceptible
OP1.MM2	OP1.102	Body	1	0	0	0	0	0	0	0	Thin parallel incised lines, but eroded so almost imperceptible
OP1.NN2	OP1.57.S1	Body	1	0	0	0	0	0	0	0	Bands of parallel incisions (oblique to each other) of <1mm wide, done with a sharp tool
Outlier	OP1.176	Body	0	0	0	0	0	1	0	0	Bright light orange paint
Outlier	OP1.85	Body	1	0	0	0	0	0	0	0	Geometric incision, similar to the others, <1mm
Totals			**19**	**2**	**14**	**0**	**0**	**4**	**1**	**2**	

OP1

OP2



Appendix 12

Barillas ceramic analysis

A Macrofabric

MF Group	Texture	Feld spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Or-ganic	Fre-quency	Sor-ting	Round ness	Shape	Orientation	Void shape	Void orient	Core-margin	Hard ness	Fracture	Induct ion1 (grs)	Feel	Induct ion2 (grs)	Induct ion3 (grs)	Induct ion4 (grs)	Comments
UBI1.A	Coarse - Medium	1	1	1	0	1	1	0	0	0	<5-5%	MS	LS	Subangular/Subrounded	Concentric/Chaotic	Plate/Oval-sphere	Subparallel/Oblique/Chaotic	2-10	S	Fine	111,2	Powdery	8	33,9	3,9	Import
UBI1.B	Very coarse - Coarse	1	1	0	0	0	1	0	1	0	30->30%	WS	LS	Subangular/Subrounded	Oblique/Concentric/Chaotic	Plate/Oval-sphere	Subparallel/Oblique/Chaotic	2-6-8-14	S	Irregular	82,2	Rough	0	0	187,1	
UBI1.C	Very coarse - Fine	1	1	0	1	0	1	0	0	0	5-10%	WS/MS	LS	Subangular/Subrounded	Concentric/Chaotic	Plate/Oval-sphere	Chaotic	1-3	S	Hackly	0	Smooth	0	33	0	
UBI1.D	Very coarse - Coarse	1	1	1	1	0	1	0	0	0	30->30%	MS	HS/LS	Subangular/Subrounded	Oblique/Concentric/Chaotic	Plate/Oval-sphere	Concentric/Chaotic	2-8-10	S	Subconchoidal/Irregular/Hackly	1,5	Smooth	20,8	105,6	21,5	
UBI1.E	Coarse - Medium	1	0	1	0	1	1	0	0	0	15-20%	PS	LS	Subangular/Subrounded	Concentric/Chaotic	Irregular	Chaotic	4-10	H	Irregular	77	Rough	16	0	71	Metallic sound
UBI1.F	Very coarse - Medium	1	0	1	0	1	1	0	0	0	20-25%	PS	LS	Subangular/Subrounded	Chaotic	Plate/Oval-sphere/Irregular	Subparallel/Horizontal/Oblique/Concentric/Chaotic	4-8-10	S/H	Fine	34	Smooth	0	0	0	
UBI1.G	Fine	1	0	0	0	1	1	0	1	0	<5%	VWS	HS	Subangular/Subrounded/Rounded	Chaotic	Plate	Subparallel	9	H	Fine	2	Smooth	0	15,7	22	
UBI1.H	Coarse	1	1	1	0	1	1	0	0	0	20-25%	MS	LS	Subangular/Subrounded	Suparallel/Concentric/Chaotic	Irregular	Chaotic	10	H	Irregular	31,3	Rough	9,1	50,7	17,2	
UBI1.I	Fine	1	1	0	0	1	1	0	0	0	5-15%	WS/PS	HS	Subangular/Subrounded/Rounded	Oblique/Concentric	Plate/Oval-sphere	Parallel/Concentric	3-9	H	Fine	16	Rough	13,9	44,9	2	
UBI1.J	Fine	1	1	0	0	1	1	0	0	0	20%	VWS	HS	Subrounded/Rounded	Oblique/Concentric	Plate/Oval-sphere	Oblique/Concentric	9	S	Fine	6	Rough	42,7	0	3,8	
UBI1.K	Medium - Fine	1	1	0	1	1	1	0	0	0	10-15%	PS	HS	Angular/Subangular/Subrounded/Rounded	Horizontal/Oblique/Concentric/Chaotic	Plate/Oval-sphere/Irregular	Subparallel/Chaotic	1-3	H	Fine	15	Smooth	19	46,4	48,2	
UBI1.L	Medium - Fine	1	0	0	1	1	1	0	1	0	15-20%	MS	HS	Subangular/Subrounded/Rounded	Oblique/Concentric/Chaotic	Plate	Subparallel/Oblique/Chaotic	1-9-19	H	Fine	32	Smooth	23,3	34	30,2	
UBI1.M	Medium - Fine	1	1	1	1	1	1	0	0	0	5-10%	VWS	HS	Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate/Oval-sphere	Oblique	1	S	Fine	0	Smooth	0	22,1	11,2	
UBI1.N	Medium - Fine	1	1	1	1	1	1	0	0	0	15-20%	MS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate/Oval-sphere/Irregular	Oblique	1-3-19	S	Fine	3,1	Smooth	13,1	24,7	19	
UBI1.O	Medium - Fine	1	1	0	1	1	1	0	0	0	10%	MS	HS	Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate/Oval-sphere	Oblique	1-9-13	H	Fine	15,5	Powdery	66	6,7	33,6	
UBI1.P	Medium - Fine	1	0	0	1	1	1	0	0	1	15-20%%	WS	HS	Subangular/Subrounded/Rounded	Oblique/Concentric/Chaotic	Plate/Oval-sphere	Oblique	3-9-19	H	Fine	8	Powdery	21,6	8	20	
UBI1.Q	Medium - Fine	1	1	0	1	1	1	0	0	1	5-10%	WS	HS/LS	Subangular/Subrounded/Rounded/Flat	Chaotic	Plate/Oval-sphere/Rhombs	Horizontal/Oblique/Concentric	1-3-19	S/H	Fine	32	Powdery	4	0	45,3	
UBI1.R	Coarse - Medium	1	1	0	0	1	1	0	1	1	15-20%	VWS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Concentric/Chaotic	Plate/Oval-sphere	Parallel/Oblique	2-10-12	H	Fine	3	Rough	15,9	6,7	3,6	
UBI1.S	Coarse - Medium	1	1	0	1	1	1	0	0	1	15-20%	MS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Chaotic	Plate/Oval-sphere	Oblique	4-8-14-18	H	Fine/Irregular	6,6	Smooth	29,8	8,1	16	

MF Group	Texture	Feld spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Or-ganic	Fre-quency	Sor-ting	Round ness	Shape	Orientation	Void shape	Void orient	Core-margin	Hard ness	Fracture	Induct ion1 (grs)	Feel	Induct ion2 (grs)	Induct ion3 (grs)	Induct ion4 (grs)	Comments
UBI1.T	Coarse - Medium	1	1	0	0	1	1	0	0	0	10-15%	WS	HS/LS	Angular/Subangular/Subrounded/Rounded	Oblique/Concentric/Chaotic	Plate/Oval-sphere	Concentric/ Chaotic	2-8-10	H	Fine	7,3	Powdery	4,7	10,1	60,9	smoked surfaces
UBI1.U	Coarse - Medium	1	0	0	1	1	1	0	0	0	10-15%	MS	HS	Angular/Subangular/Subrounded/Rounded	Oblique/Concentric/Chaotic	Oval-sphere	Subparallel	2-10	H	Fine	23,3	Smooth	0	18	62,4	smoked surfaces
UBI1.V	Coarse - Medium	1	1	1	1	1	1	0	0	0	5-10%	MS	HS/LS	Angular/Subangular/Subrounded/Rounded	Subparallel/ Oblique/Concentric	Plate/Oval-sphere	Oblique	2	H	Fine	12,2	Powdery	0	0	12	
UBI1.W	Coarse - Medium	1	0	0	1	1	1	0	0	0	5%	PS	HS/LS	Subangular/Subrounded/Rounded	Oblique/Concentric/Chaotic	Plate/Oval-sphere	Oblique/Chaotic	2-22	H	Irregular	3,3	Powdery	8	0	2,9	
UBI1.X	Coarse - Medium	1	1	0	1	1	1	0	0	0	10-15%	VWS	HS	Subangular/Subrounded/Rounded/Flat	Subparallel/ Oblique/Chaotic	Oval-sphere	Oblique/Chaotic	2-4-18	H	Fine	2,8	Powdery	6,5	24,8	37,1	Smoked surfaces
UBI1.Y	Coarse - Medium	1	0	1	1	1	1	0	1	0	5-10%	WS	LS	Veryangular/ Angular/Subangular	Subparallel/ Oblique	Plate/Oval-sphere/Irregular	Oblique/Concentric/Chaotic	2-4-10	S	Fine	19	Powdery	46,4	51,6	33,5	
UBI1.Z	Coarse - Medium	1	1	0	1	1	1	0	0	0	5-10%	WS	HS/LS	Subangular/Subrounded/Rounded	Chaotic	Oval-sphere/Irregular	Parallel/Oblique/Chaotic	2	H	Fine	19	Powdery	0	9,4	3,2	
UBI1.AA	Coarse - Medium	1	1	0	1	1	1	0	0	0	5-10%	WS	HS	Subangular/Subrounded/Rounded	Oblique	Plate/Oval-sphere	Parallel/Oblique	2-4	H	Fine/Irregular	8	Smooth	5,8	7,2	10	
UBI1.BB	Very coarse - Medium	1	1	0	1	1	1	0	0	0	10-15%	MS	HS/LS	Angular/Subangular/Subrounded/Rounded	Oblique/Concentric/Chaotic	Plate/Oval-sphere	Parallel/Horizontal/Oblique/Concentric/Chaotic	2-4-16	H	Fine	50,2	Powdery	24	17,7	52,9	
UBI1.CC	Coarse - Medium	1	1	1	1	1	1	0	0	0	5-10%	MS	HS/LS	Subangular/Subrounded/Rounded/Flat	Subparallel/ Oblique/Concentric/Chaotic	Plate/Oval-sphere/Irregular	Subparallel/ Oblique/Chaotic	2-8-10-16	H	Fine	64	Powdery	4	28,1	46,2	smoked surfaces
UBI1.DD	Coarse - Medium	1	1	1	0	1	1	0	0	0	10-15%	VWS	HS	Subangular/Subrounded/Rounded	Horizontal/Oblique/Concentric	Oval-sphere	Oblique/Concentric/Chaotic	4-8-10	H	Fine	4	Powdery	3,3	35	25,3	
UBI1.EE	Coarse - Medium	1	1	1	1	1	1	0	0	0	10-15%	WS/MS	HS	Subangular/Subrounded/Rounded	Chaotic	Plate/Oval-sphere	Subparallel/ Oblique/Chaotic	2-4-8-10-12	H	Fine	22,9	Powdery	2,5	15,5	19	
UBI1.FF	Coarse - Medium	0	1	1	0	1	1	0	0	0	10-15%	WS	HS/LS	Subangular/Subrounded/Rounded	Chaotic	Plate/Oval-sphere	Oblique/Chaotic	2-4-10	H	Fine	38,5	Powdery	8,5	1,3	10	
																					750,9		416,9	659,2	931	

B Macrotrace (petro)

MF group	Sherd code	Strati-graphy	Vessel part	Shape	(cm)	Wall thick-ness (mm)	Macro-assess-ment	Petro-assess-ment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equi-distant	Position	Pre-forming	Grain position	Stria-tions	Finishing	Surface treatment	Firing T	Context	Pro-posed use	Comments
UBI1.B 4.3	UBI.1A .4.1	UBI1AIB 5	Rim	Comal	25	10	quartz tempering	Tempered	1	Very coarse - Coarse	2,5	<body	Outside	N/A	alternate	Pinching, WC (not determined)	Outside	NO	eroded	eroded	<750	off mound	cooking	
UBI1.B 4	UBI1BI II6	UBI1BIII 6	Body	Comal	N/A	5-8	quartz tempering	Tempered	1	Very coarse - Coarse	2-2.2	N/A	N/A	YES	alternate	Pinching,W C (scraping)	Outside	NO	eroded	eroded	<750	off mound	cooking	
UBI1.B 4.1/UB I1.B4.2	UBI1.4 9	UBI1BIII 5	Rim + body sherd	Comal	42	7.5-12	quartz tempering	Tempered	1	Very coarse - Coarse	1.5-2	<body	Inside	YES	alternate	Pinching, WC (fingers or scraping)	Outside	NO	eroded	eroded	<750	off mound	cooking	
UBI1.B B1	UBI1BI B5.42	UBI1BIB 5	Neck/S houlder	Olla	7,5	6.5-7	quartz tempering	Tempered	4	Very coarse - Medium	1	N/A	N/A	N/A	alternate	Pinching, scraping	Outside/I nside	YES	WC	slip (red), LHC, burnishing outer surface	<750	off mound	cooking/ storage	
UBI1.A 2	UBI1B. 46.S1	UBI1BIB 5	Base+s upport	N/A	N/A	5	Bastard	Sieved	5	Course - Medium	N/A	N/A	N/A	N/A	N/A	Pinching, N/A	Inside	NO	eroded	orange slip	<750	off mound	serving	cannot break it for further analysis (fragment is too small), support attached and pinched to the base
UBI1.B 1	UBI1B. 8.S7	UBI1BIB 5	Body	Olla(R)	N/A	11	quartz tempering	Tempered	1	Very coarse - Coarse	1,9	N/A	N/A	YES	alternate	Pinching, WC	Outside/I nside	YES(mild)	WC	slip	<750	off mound	cooking/ storage	
UBI1.I 1	UBI1C. 51.1	UBI1CXII I5	Rim	Plate	15	5	Sorted/sie ved paste	Sieved	6	Fine	1,2	<body	Outside	N/A	Oblique (o-i)	Pinching, WC	Outside/I nside	NO	WC	slip (red outside, brown, inside), burnished outer surface	<750	on mound	serving	
UBI1. O4	UBI1C. 25.2	UBI1CXI 2	Rim	CR	25	5,5	Sorted/sie ved paste	Sieved	6	Medium - Fine	1,4	body	Inside	N/A	N/A	Pinching, WC	Outside	NO	WC	N/A	<750	on mound	serving/ storage	
UBI1.E 4	UBI1C. 35.S2	UBI1CXI 4	Body	R	N/A	6	Some sorting/sie ving	Sieving	3(subgro up)	Coarse - Medium	1,2	N/A	N/A	YES	alternate	Pinching, WC	Outside	YES	WC	N/A	<750	on mound	serving/ storage	
UBI1.A 1	UBI1BI B5.9	UBI1BIB 5	Rim/bo dy	CRD	25	5,5	Bastard	Sieved	5	Course - Medium	1	body	Outside	YES	alternate	Pinching, WC	Outside	YES(mild)	WC	slip, LHC	<750	off mound	serving/ storage	It has the remmanent of an applique decoration on the outer surface
UBI1.C C3	UBI1C XIII5	UBI1CXII 5	Body	U	N/A	4,5	Sorted/sie ved paste	No preparatio n	7	Coarse - Medium	1	N/A	N/A	YES	Oblique (i-o)	Pinching, WC (fingers?)	Outside/I nside	YES(mild)	WC (fingers?)	slip, LHC	<750	on mound	serving	in general, i appreciate WC pre-forming and finishing with a final LHC smoothing at the end (surf treatement"?) in many of the sherds. interior of this sherd has a micritic calcite, it is not slip
UBI1.S 2	UBI1C. 25.S1	UBI1CXI 2	Body	U	N/A	6,5	Some sorting/sie ving	Sieving	3(subgro up)	Coarse - Medium	1	N/A	N/A	YES	Oblique (i-o)	Pinching, WC	Outside/I nside	NO	WC	slip, LHC	<750	on mound	serving	red slip is very thin
UBI1.T 3	UBI1C. 20.1	UBI1CXI 1	Rim	CRD	18	7	Some sorting/sie ving	No preparatio n	3	Coarse - Medium	1	>body	Outside	YES	Oblique (o-i)	Pinching, WC	Outside/I nside	NO	WC	slip (brown), LHC	<750	on mound	serving/ storage	

MF group	Sherd code	Strati-graphy	Vessel part	Shape	(cm)	Wall thick-ness (mm)	Macro-assess-ment	Petro-assess-ment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equi-distant	Position	Pre-forming	Grain position	Stria-tions	Finishing	Surface treatment	Firing T	Context	Pro-posed use	Comments
UBI1.B 4.3	UBI.1A .4.1	UBI1AIB 5	Rim	Comal	25	10	quartz tempering	Tempered	1	Very coarse - Coarse	2,5	<body	Outside	N/A	alternate	Pinching, WC (not determined)	Outside	NO	eroded	eroded	<750	off mound	cooking	
UBI1.B 4	UBI1BI II6	UBI1BIII 6	Body	Comal	N/A	5-8	quartz tempering	Tempered	1	Very coarse - Coarse	2-2.2	N/A	N/A	YES	alternate	Pinching,W C (scraping)	Outside	NO	eroded	eroded	<750	off mound	cooking	
UBI1.B 4.1/UB I1.B4.2	UBI1.4 9	UBI1BIII 5	Rim + body sherd	Comal	42	7.5-12	quartz tempering	Tempered	1	Very coarse - Coarse	1.5-2	<body	Inside	YES	alternate	Pinching, WC (fingers or scraping)	Outside	NO	eroded	eroded	<750	off mound	cooking	
UBI1.B B1	UBI1BI B5.42	UBI1BIB 5	Neck/S houlder	Olla	7,5	6.5-7	quartz tempering	Tempered	4	Very coarse - Medium	1	N/A	N/A	N/A	alternate	Pinching, scraping	Outside/I nside	YES	WC	slip (red), LHC, burnishing outer surface	<750	off mound	cooking/ storage	
UBI1.A 2	UBI1B. 46.S1	UBI1BIB 5	Base+s upport	N/A	N/A	5	Bastard	Sieved	5	Course - Medium	N/A	N/A	N/A	N/A	N/A	Pinching, N/A	Inside	NO	eroded	orange slip	<750	off mound	serving	cannot break it for further analysis (fragment is too small), support attached and pinched to the base
UBI1.B 1	UBI1B. 8.S7	UBI1BIB 5	Body	Olla(R)	N/A	11	quartz tempering	Tempered	1	Very coarse - Coarse	1,9	N/A	N/A	YES	alternate	Pinching, WC	Outside/I nside	YES(mild)	WC	slip	<750	off mound	cooking/ storage	
UBI1.I 1	UBI1C. 51.1	UBI1CXII I5	Rim	Plate	15	5	Sorted/sie ved paste	Sieved	6	Fine	1,2	<body	Outside	N/A	Oblique (o-i)	Pinching, WC	Outside/I nside	NO	WC	slip (red outside, brown, inside), burnished outer surface	<750	on mound	serving	
UBI1. O4	UBI1C. 25.2	UBI1CXI 2	Rim	CR	25	5,5	Sorted/sie ved paste	Sieved	6	Medium - Fine	1,4	body	Inside	N/A	N/A	Pinching, WC	Outside	NO	WC	N/A	<750	on mound	serving/ storage	
UBI1.E 4	UBI1C. 35.S2	UBI1CXI 4	Body	R	N/A	6	Some sorting/sie ving	Sieving	3(subgro up)	Coarse - Medium	1,2	N/A	N/A	YES	alternate	Pinching, WC	Outside	YES	WC	N/A	<750	on mound	serving/ storage	
UBI1.A 1	UBI1BI B5.9	UBI1BIB 5	Rim/bo dy	CRD	25	5,5	Bastard	Sieved	5	Course - Medium	1	body	Outside	YES	alternate	Pinching, WC	Outside	YES(mild)	WC	slip, LHC	<750	off mound	serving/ storage	It has the remmanent of an applique decoration on the outer surface
UBI1.C C3	UBI1C XIII5	UBI1CXII 5	Body	U	N/A	4,5	Sorted/sie ved paste	No preparatio n	7	Coarse - Medium	1	N/A	N/A	YES	Oblique (i-o)	Pinching, WC (fingers?)	Outside/I nside	YES(mild)	WC (fingers?)	slip, LHC	<750	on mound	serving	in general, i appreciate WC pre-forming and finishing with a final LHC smoothing at the end (surf treatement"?) in many of the sherds. interior of this sherd has a micritic calcite, it is not slip
UBI1.S 2	UBI1C. 25.S1	UBI1CXI 2	Body	U	N/A	6,5	Some sorting/sie ving	Sieving	3(subgro up)	Coarse - Medium	1	N/A	N/A	YES	Oblique (i-o)	Pinching, WC	Outside/I nside	NO	WC	slip, LHC	<750	on mound	serving	red slip is very thin
UBI1.T 3	UBI1C. 20.1	UBI1CXI 1	Rim	CRD	18	7	Some sorting/sie ving	No preparatio n	3	Coarse - Medium	1	>body	Outside	YES	Oblique (o-i)	Pinching, WC	Outside/I nside	NO	WC	slip (brown), LHC	<750	on mound	serving/ storage	

MF group	Sherd code	Strati-graphy	Vessel part	Shape	(cm)	Wall thick-ness (mm)	Macro-assess-ment	Petro-assess-ment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equi-distant	Position	Pre-forming	Grain position	Stria-tions	Finishing	Surface treatment	Firing T	Context	Pro-posed use	Comments
UBI1.P 2	UBI1C. 27.S2	UBI1CXI 3	Base	CRD	N/A	6	Some sorting/sieving	Sieved	6	Medium - Fine	1.2-1.5	N/A	N/A	N/A	N/A	Pinching, WC	Outside/Inside	NO	WC	slip(brown), LHC, burnishing	<750	on mound	serving	Base is slightly concave, it got destroyed when cutting for better pictures, mixing of clays indicates coarser paste for the walls, appears assembled elements on both wall and base
UBI1.F F1	UBI1C XIII5	UBI1CXII I5	Body	CR	N/A	7	Some sorting/sieving	Sieved	6	Coarse - Medium	1,8	N/A	N/A	N/A	alternate	Pinching, WC	Outside/Inside	NO	WC	slip (brown), LHC	<750	on mound	serving/ storage	Heavy LHC surface treatment erases WC pre-forming traces, some grains outside evince WC pre-work
UBI1.H 3	UBI1C. 27.7	UBI1CXI 3	Rim	CCC	20	4,5	No paste prep	No preparation	3	Coarse	1,5	<body	Inside	N/A	N/A	Pinching, WC	Outside/Inside	NO	WC	slip(red), LHC, burnishing	<750	on mound	serving/ storage	
UBI1.K 4	UBI1C. 27.S1	UBI1CXI 3	Base+support	N/A	N/A	5,5	Sorted/sieved paste, maybe tempered	Tempered	4	Medium - Fine	1	N/A	N/A	YES	spiral?	Pinching, WC	Outside/Inside	NO	WC	LHC	<750	on mound	serving/ storage	Buttom support
UBI1.D D3	UBI1C. 27.4	UBI1CXI 3	Rim	N/A	50	6	NONE	No preparation	7	Coarse - Medium	1	<body	Inside	N/A	Oblique (i-o)	Pinching, WC	Outside/Inside	NO	WC	Slip, LHC smoothing on slipped surf only	<750	on mound	N/A	black band of paint on lip on red slip
UBI1.U 3	UBI1C. 27.2	UBI1CXI 3	Rim	CR	10	4,5	Some sorting/sieving, maybe temper	No preparation	3	Coarse - Medium	1	>body	Outside	N/A	Oblique (o-i)	Pinching, WC	Outside/Inside	Yes (mild)	WC, (fingers?)	Slip, LHC	<750	on mound	serving/ storage	Red orange slip
UBI1.U 2	UBI1C. 27.3	UBI1CXI 3	Rim	CRD	20	5,5	Some sorting/sieving, maybe temper	Tempered	4	Coarse - Medium	1,5	body	Inside	YES	Oblique (i-o)	Pinching, possible WC(couple of grainsoutside)	Inside	NO	WC (possibly)	Slip, LHC	<750	on mound	serving/ storage	Orangebrown slip

C Rims

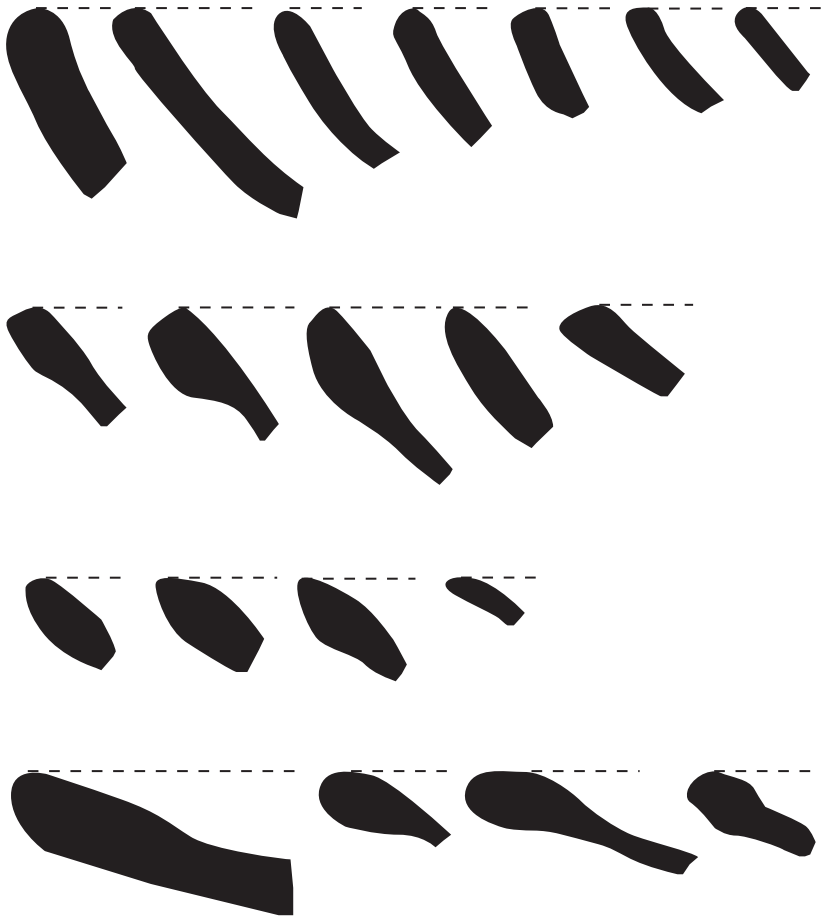
Rim Code	U/R	Shape	Wall ∠ (°)	Base ∠ (°)	(cm)	%	Wall (mm)	Rim profile	Rim ∠ (°)	Lip morphology
UBI1BIB5.9	U	CRD	120		25	10	5,5	Outflaring straight	82	Round
UBI1CXIII4.36	NI	NI	35		20	4	3,5	Excurvated	35	Thickened
UBI1CXI3.30	U	CR	80		9	7	5,5	Incurved	100	Round
UBI1CXI4.35	U	P	20		32	4	4	Direct	20	Thickened
UBI1CXIII5.51	R	O	120		22	4	5	Direct	120	Thickened inside
UBI1BIII5.49	U	CM	10		42	3	9	Direct	10	Thickened
UBI1CXI1.20(1)	U	CRD	125		18	5	7	Excurvated	80	Thickened inside
UBI1CXI1.20(2)	U	CRD	60		30	10	4	Direct	60	Thickened & beveled inside
UBI1CXI1.20(3)	U	CC	65		25	3	4	Direct	65	Round
UBI1CXI1.20(4)	R	O	100		15	7	8	Vertical	90	Thickened
UBI1CXI1.20(5)	U	P/CM?	5		15	4	5	Direct	5	Thickened
UBI1CXII5.53(1)	U	CR	80		25	4	3	Excurvated	50	Round
UBI1CXII5.53(2)	U	P	5		23	5	3,5	Direct	5	Thinned
UBI1CXII5.53(3)	U	P	10		15	4	5	Direct	10	Round
UBI1CXI2.25(1)	U	CRD	60		35	11	4	Everted	60	Everted, thickened, beveled both sides
UBI1CXI2.25(2)	U	CR	90		25	3	5,5	Direct	90	Thickened, beveled both sides
UBI1CXI2.25(3)	U	CRD	40		25	3	4	Direct	40	Round
UBI1CXI2.25(4)	U	CRD	30		25	3	8	Direct	30	Flat
UBI1CXI2.25(5)	R	O	125		6	20	5,5	Excurvated	60	Thinned
UBI1CXI2.25(6)	U	CC	30		17	7	5,5	Direct	40	Round
UBI1CXI3.27(1)	U	CRD	50		20	7	5	Direct	50	Thickened inside
UBI1CXI3.27(2)	U	CR	80		10	9	4,5	Excurvated	60	Slightly everted
UBI1CXI3.27(3)	U	CRD	70		20	4	5,5	Direct	70	Round
UBI1CXI3.27(4)	NI	NI	NI		50	2	6	NI	55	Beveled
UBI1CXI3.27(5)	U	CRD	70		40	2	6	Vertical	90	Flat
UBI1CXI3.27(6)	U	CRD	60	35	15	4	6	Direct	60	Round
UBI1CXI3.27(7)	U	CCC	70		20	3	4,5	Incurved	105	Round, thickened
UBI1AIB5.4(1)	U	CM	60		25	4	10	Direct	60	round, slightly thickened inside
UBI1AIB5.4(2)	U	CR	80		14	6	6,5	Direct	80	Thinned
UBI1AIB5.4(3)	U	CRD	65		28	2	7	Direct	65	Flat
UBI1AIB5.4(4)	U	CRD	60		11	6	6,5	Direct	60	Beveled inside
UBI1AIB5.4(5)	NI	NI	NI		6	9	7	Excurvated	50	Beveled outside
UBI1AIB5.4(6)	NI	NI	NI		10	7	8	NI	50	Round
UBI1AIB5.4(7)	R	CR	80		23	3	6,5	Incurved	100	Thinned
UBI1AIB5.4(8)	NI	NI	NI		25	2	9	NI	100	Flat
UBI1CXIII5.43(1)	R	CRC	130		10	7	12	Direct	130	Beveled inside
UBI1CXIII5.43(2)	U	CRD	60		14	5	5	Direct	60	Beveled outside
UBI1CXIII5.43(3)	U	CR	80		15	3	5	Direct	80	Slightly flat
UBI1BIB5.8(1)	U	CR	85		10	5	5	Excurvated	60	Everted, beveled inside
UBI1BIB5.8(2)	U	CRD	40		20	7	6	Direct	40	Flat
UBI1BIB5.8(3)	U	CRD	60		25	3	5	Excurvated	40	Everted, beveled outside
UBI1BIB5.8(4)	R	CRC	120		20	5	8	Direct	120	Slightly flat
UBI1BIB5.8(5)	U	CRD	55		15	3	5	Vertical	90	Round
UBI1BIII6.18(1)	U	CC	45		13	4	5	Vertical	70	Flat
UBI1BIII6.18(2)	NI	NI	NI		16	7	3,5	Excurvated	30	Roound
UBI1AIII6.16(1)	U	CRD	40		28	4	7	Direct	40	Round
UBI1AIII6.16(2)	U	CR	80		18	6	5	Direct	80	Thickened outside, flat
UBI1AIII6.16(3)	U	P	30		20	2	5	Direct	30	Thickened, beveled both sides
UBI1AIII6.13(1)	U	CRD	60		17	2	8	Direct	60	Thinned
UBI1AIII6.13(2)	U	CRD	70		15	4	4,5	Direct	70	Thickened

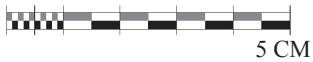
UBI1

D Decoration & Appendages

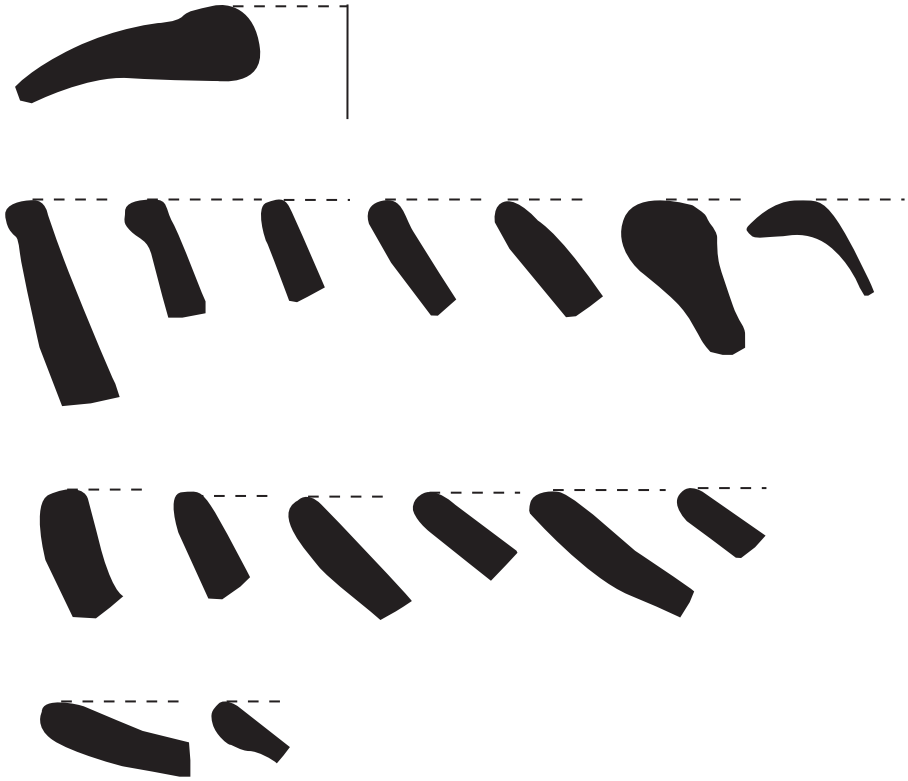
MF Group	Sample Code	Part	Incision	Punctuation	Applique	Zoomorphic	Anthropomorphic	Paint	Comments
UBI1.A1	UBI1B.10.S1	Support	0	0	0	1	0	0	"peccari"
UBI1.E3	UBI1C.25	Body (u)	0	0	1	0	1	0	Anthropomorphic face
UBI1.G4	UBI1C.24	Support	0	0	0	1	0	0	bird?
UBI1.K3	UBI1CXIII5	Body (u)	1	0	1	0	0	0	applique rope like, incisions made possibly with finger (nail section)
UBI1.Z1	UBI1C.30	Support?	0	0	1	0	0	0	modelled
UBI1.X2(OUT)	UBI1C.36	Support	0	0	0	0	0	0	cilindrical support (1 coil)
UBI1.A2	UBI1B.46.S1	Base+support	0	0	1	0	0	0	cut coil support, not clear if it is an annular base or a roundish support, bastard paste too eroded to assess
UBI1.DD3	UBI1C.27.4	Rim	1	0	0	0	0	1	incisions (wide, 1.5mm) perpendicular to the lip.
UBI1.K4	UBI1C.27.S1	Base+support	0	0	1	0	0	0	Roundish support, similar to UBI1B.46.S1 but in a paste that looks more local
Totals			**2**	**0**	**5**	**2**	**1**	**1**	

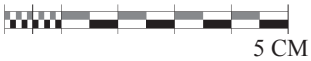
UBI1





UBI2





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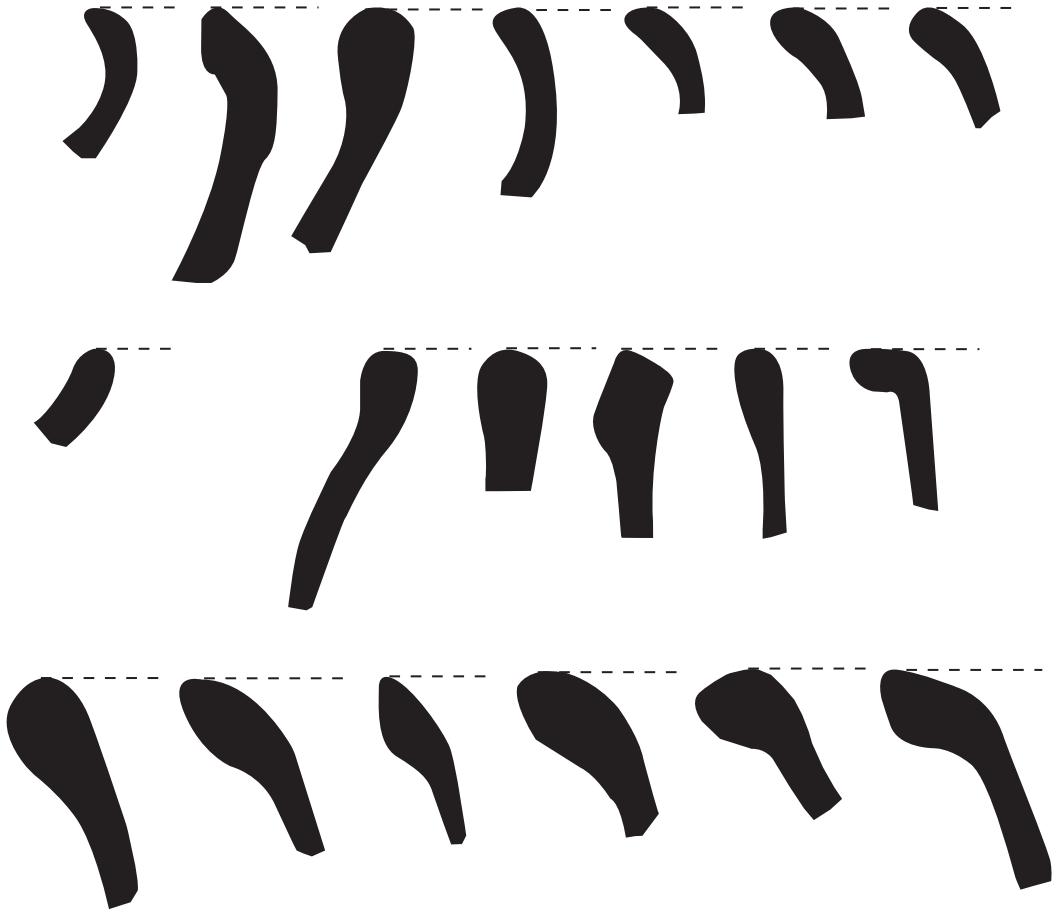

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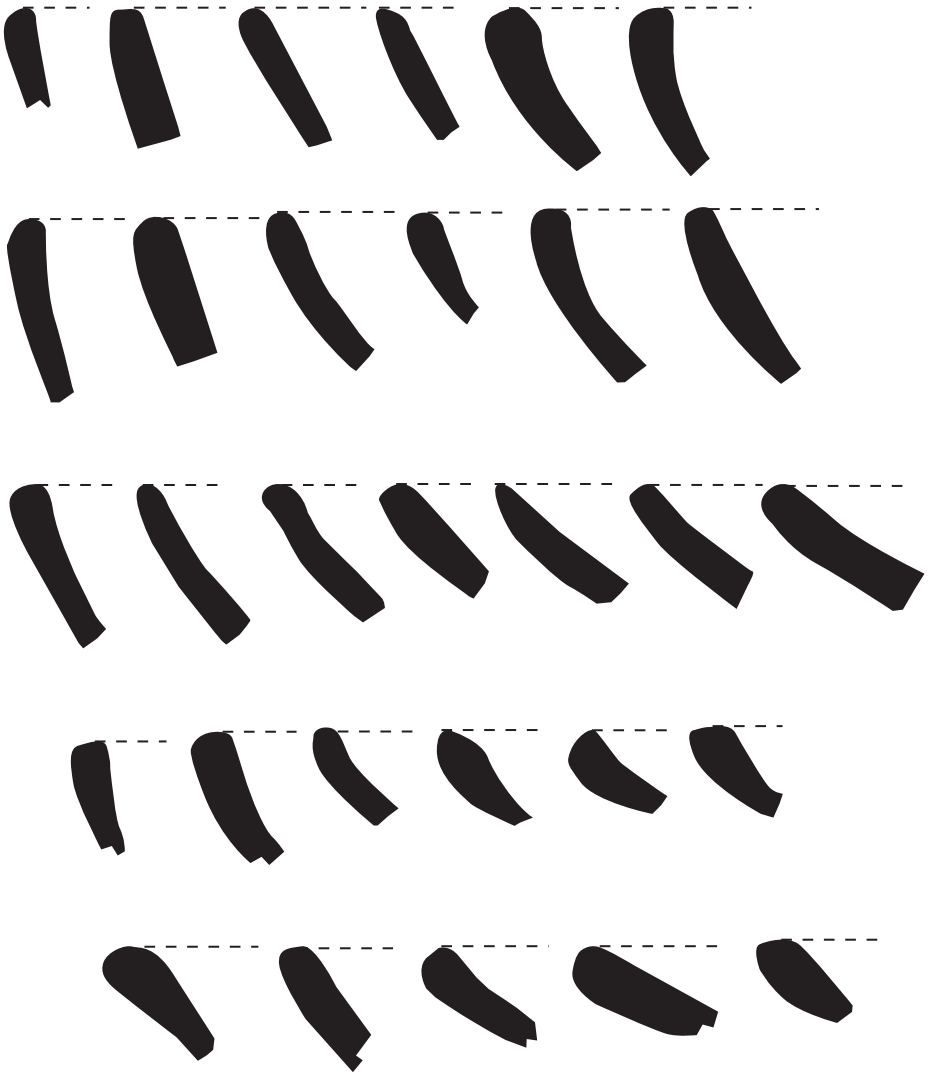

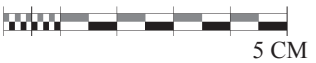

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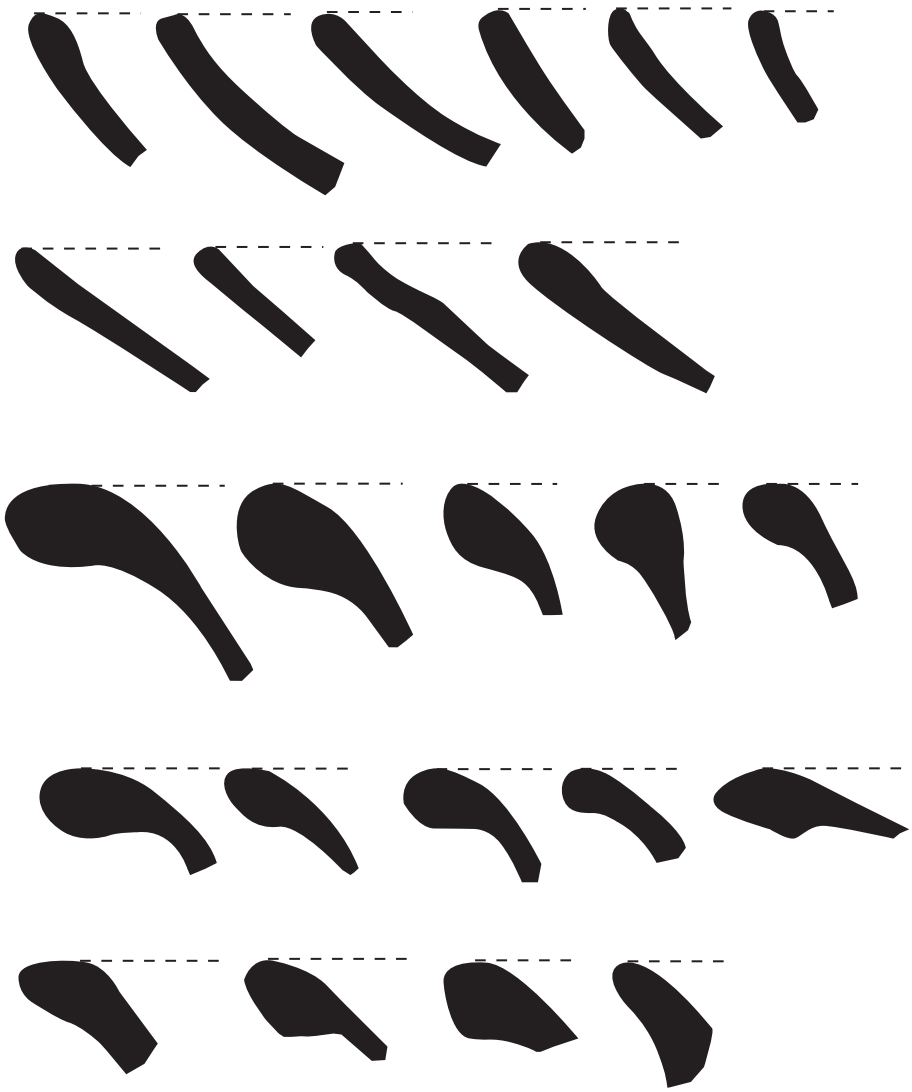

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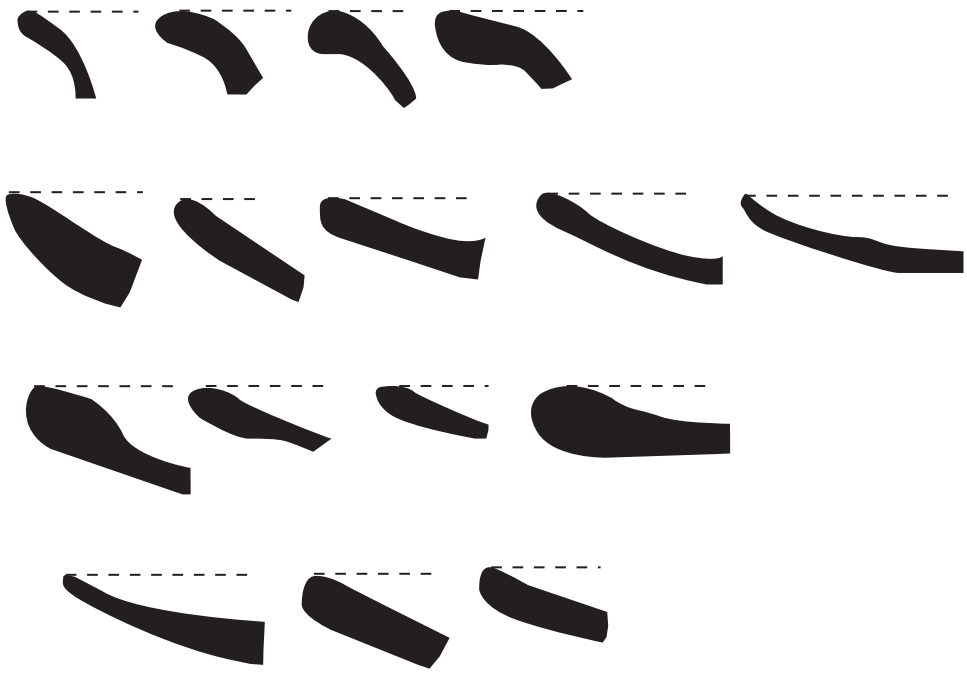
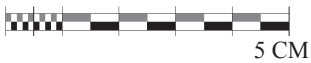




Appendix 13

Rosa Dolores Oporta ceramic analysis

A Macrofabric

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Or-ganic	Fre-quency	Sorting	Round ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Frac-ture	Feel	Inductio n1 (grs)	Inductio n2 (grs)	Inductio n3 (grs)	Inductio n4 (grs)	Comments
RDO1.A	Medium	1	0			1	1				5%	WS	LS	Subangular/ Subrounded/ Rounded/We llrounded	Chaotic	Plate	Obliqu e/Cha otic	2-8	S	Fine	Rough	0	0,9	0	40	
RDO1.B	Medium	1				1	1		1		5%	MS	LS	Subrounded/ Rounded/We llrounded	Oblique/ Chaotic	Plate/Ir regular	Conce ntric	2-20	H	Fine	Rough	0	0	0	71,6	
RDO1.C	Medium	1				1	1				15-20%	WS	LS	Subangular/ Subrounded/ Rounded/We llrounded	Oblique/ Chaotic	Plate/Ir regular	Obliqu e/Con centric /Chaot ic	2	S/H	Fine	Rough	15,2	1,5	0	25,3	
RDO1.D	Medium	1		1		1	1		1		25%	VWS	LS	Subangular/ Subrounded/ Rounded/We llrounded/Fla t	Oblique/ Chaotic	Plate/ Oval-sphere	Subpa rallel	2-10	S	Hackl y	Smooth	0	0	0	19,8	
RDO1.E	Coarse	1		1	1	1	1				5-10%	PS	LS	Subangular/ Subrounded	Oblique/ Concent ric/Chao tic	Plate/Ir regular	Subpa rallel/ Chaoti c	2-4-6	H	Fine	Smooth	73	13,1	45,8	36,1	
RDO1.F	Coarse	1				1	1		1		20%	PS	LS	Subangular/ Subrounded/ Flat	Oblique	Plate/Ir regular	Obliqu e/Cha otic	2-8	H	Fine/I rregul ar	Harsh	0	0	0	19,8	
RDO1.G	Coarse	1				1					20-25%	MS	HS/LS	Angular/Sub angular/Subr ounded/Roun ded	Oblique/ Chaotic	Plate/ Oval-sphere /Irregul ar	Supar allel/O blique/ Chaoti c	8-10	H	Irreg ular	Rough	27,4	0	0	36,9	
RDO1.H	Coarse	1				1	1				5%	PS	LS	Subangular/ Subrounded/ Flat	Oblique/ Chaotic	Plate/Ir regular	Subpa rallel	2-8	H	Irreg ular	Rough	0	0	0	19,6	
RDO1.I	Coarse	1				1	1				5-10%	PS	LS	Angular/Sub angular/Subr ounded	Chaotic	Plate/Ir regular	Obliqu e/Cha otic	10	H	Irreg ular	Harsh	0	0	0	49,6	
RDO1.O UTLIER S	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	6,7	0	46,9	
RDO2.A	Fine	1		1		1	1				20%	MS	HS/LS	Subrounded/ Rounded	Chaotic	N/A	N/A	1	S	Fine	Rough	0	3,6	0	7	
RDO2.B	Fine	1		1		1	1		1		10-15%	MS	LS	Subrounded/ Rounded	Oblique/ Chaotic	Irregul ar	Chaoti c	1	S/H	Fine/I rregul ar/Ha ckly	Rough	0	6,7	14,8	17,1	
RDO2.C	Fine	1				1	1		1		20-25%	VWS	HS	Subrounded/ Rounded	Oblique/ Chaotic	Plate/Ir regular	Obliqu e/Cha otic	19	H	Fine	Harsh	0	0	0	42,2	metallic sound
RDO2.D	Medium	1	1			1	1		1		10-20%	MS	HS/LS	Subangular/ Subrounded/ Rounded	Chaotic	Oval-sphere /Irregul ar	Chaoti c	2	H	Subc onch oidal	Rough	0	0	8	57,4	
RDO2.E	Medium	1		1	1	1	1				10-15%	WS/MS	HS/LS	Subrounded/ Rounded	Chaotic	Plate/Ir regular	Obliqu e/Cha otic	2-10-18	S/H	Fine/I rregul ar	Harsh	2,4	1,7	7	68	

MF Group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Or-ganic	Fre-quency	Sorting	Round ness	Shape	Orien-tation	Void shape	Void orient	Core-margin	Hard-ness	Frac-ture	Feel	Inductio n1 (grs)	Inductio n2 (grs)	Inductio n3 (grs)	Inductio n4 (grs)	Comments
RDO2.F	Medium	1	1	1		1	1		1		15-20%	WS/MS	HS/LS	Subrounded/ Rounded	Oblique/ Chaotic	Plate/ Oval-sphere /Irregular	Concentric/Chaotic	2-8-10-18	H	Smooth/Fine/Irregular	Rough	176,5	0	14,6	62,6	
RDO2.G	Coarse - Medium	1				1			1		20%	MS	LS	Subangular/ Subrounded/ Rounded	Oblique/ Chaotic	Oval-sphere /Irregular	Chaotic	8-10	S	Fine/ Hackly	Rough	0	0	0	111,4	
RDO2.H	Medium	1				1	1				5-10%	WS/MS	HS	Subrounded/ Rounded	Chaotic	Oval-sphere /Irregular	Chaotic	2-4-8-10	H	Fine/Irregular	Harsh	0	0	0	81,5	
RDO2.I	Coarse	1				1	1		1		10%	MS	LS	Angular/Subangular/Subrounded	Oblique/ Chaotic	Plate/Irregular	Chaotic	2-18	H	Fine/ Hackly	Harsh	0	13,9	0	30,4	
RDO2.J	Coarse	1				1	1		1		15%	PS	LS	Subangular	Chaotic	N/A	N/A	2	H	Fine/Irregular	Rough	0	0	0	19,4	
RDO2.K	Coarse	1				1	1				15%	PS	HS/LS	Subangular/ Subrounded/ Rounded	Oblique/ Chaotic	Plate/Irregular	Oblique/Chaotic	2-18	H	Fine	Rough	10	2,8	0	29,5	
RDO2.OUTLIERS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	2	0	7,2	

B Macrotrace (petro)

MF group	Sherd code	Strati-graphy	Vessel part	Shape	(cm)	Wall thick-ness (mm)	Macro-assess ment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equi-distant	Position	Pre-forming	Grain position	Stria-tions	Finishing	Surface treatment	Context	Propo sed use	Comments
RDO2.G4	RDO2II3	RDO2II3	Base	P?	N/A	4-5	Tempered?	2	Coarse - Medium	0,7	N/A	N/A	YES	Spiral	Pinching, drawing	Outside/Inside	NO	WC	LHC smoothing	below core cultural layer	Serving	No coating, it is LHC smoothing, surface topo is irregular like in JOR but no tool marks nor WC traces except for grains protuberant
RDO2.E4	RDO2I1	RDO2I2	Rim	CCC		7-8	Sieved/ Sorted?	Outlier	Medium	1,6	body	Inside	YES	Oblique (i-o)	Pinching, drawing	Outside	YES (mild)	WC	N/A	core cultural layer	N/A	Very eroded, hard to assess, apparent tool marks
ROD2.K4	RDO2I1.4(1)	RDO2I1	Rim	N/I	20	7	N/A	2	Coarse	1,4	>body	Outside	N/A	Oblique (o-i)	Pinching, drawing	Outside	NO	WC	N/A	core cultural layer	N/A	Carca rim!
RDO2.F1	RDO2II2	RDO2II2	Body	R?	N/A	11-14	N/A	2	Medium	2,5	N/A	N/A	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	NO	WC	LHC smoothing, burnishing (outside on smoked surface only apparently)\	below core cultural layer	Cooking/Storage	Big pot, wc clay traces combined with burnishing of smoked part. Section shows lots of voids, maybe poor fashioning?
RDO2.D4	RDO2I1.4(4)	RDO2I1	Rim	CRD	30	9	Tempered?	3	Medium	1.5-1.6	body	Outside (U)	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	NO	WC, brushing outside	LHC smoothing inside	core cultural layer	Serving	First trace of brushing!
RDO2.I2	RDO2.12	RDO2II2-3	Body	U	N/A	4	Sieved/ Sorted?/ Tempered?	3 (subgroup)	Coarse	1,4	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside/Inside	NO	WC	LHC smoothing, burnishing (only inside)	below core cultural layer	Serving	Incisions (parallel). Like the other samples, evident WC finishing but not clear the technique. Inside is not coating, should be group 4.
RDO2.B4	RDO2I1.4(3)	RDO2I1	Rim	CRD	25	6	Sieved/ Sorted?	1	Fine	1,8	N/A	Outside	N/A	Oblique (i-o)	Pinching, drawing	Outside	NO	WC	N/A	core cultural layer	N/A	Very eroded, hard to assess.
RDO2.I4	RDO2I2.5	RDO2I2	Rim	CC	25	9	Sieved/ Sorted?/ Tempered?	2(sg)	Coarse	1,3	N/A	N/A	N/A	Oblique (o-i)	Pinching, drawing	Outside	NO	WC	N/A	core cultural layer	N/A	Eroded, chipote outside
RDO1.E3	RDO1.59	RDO1BXII5	Body	CC?	N/A	4,5	Sieved/ Sorted?	2	Coarse	1	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside	NO	WC, fingers inside? (tool mark, but looks like finger)	Slip?	mound filling	Serving?	Paste is mica and quartz rich, so it is shiny but it is not surface treatment (looks like burnishing), maybe that was desired? Double decoration: incisions (parallel to the rim and oblique), + coil excavated\
RDO1.G4	RDO1A.VA5	RDO1A.VA5	Rim	O	25	12	Tempered?	2(sg)	Coarse	1,3	body	Inside	YES	Oblique (i-o)	Pinching, drawing	Outside	YES	WC, fingers?	N/A	floor (off-mound)	Cooking/storage	Very coarse olla, nice traces, finger or tool trace around the lip for thinning
RDO1.X4	RDO1BXV4	RDO1BXV4	Rim	O	10	9	N/A	1	Coarse	1,3	N/A	Outside (u)	N/A	N/A	Pinching, drawing	Outside	NO	WC	N/A	hearth (mound)	Cooking/storage	Carca rim!
RDO1.A4	RDO1.62	RDO1BXVII6	Body	R	N/A	7	Sieved/ Sorted?/ Tempered?	3	Medium	1,35	body	N/A	YES	Oblique (o-i)	Pinching, drawing	Outside/Inside	NO	WC, scraping? (inside)	LHC smoothing	mound foundation	Cooking/storate	Nice LHC traces outside, with hard tool
RDO1.E1	RDO1BXVII5	RDO1BXVII5	Body	C?	N/A	7.5-9.5	Sieved/ Sorted?	3	Coarse	1,25	body	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside/inside	NO	WC	LHC smoothing, reddish brown slip, burnished (outside), mild LHC smoothing on smoked area (inside)	mound foundation	Cooking/storage?	Again applying surface treatment to smoked areas, this time inside (could also be charred residues). Looks pretty sure like WC roughing out and finishing, then LHC ST

MF group	Sherd code	Strati-graphy	Vessel part	Shape	(cm)	Wall thick-ness (mm)	Macro-assess ment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equi-distant	Position	Pre-forming	Grain position	Stria-tions	Finishing	Surface treatment	Context	Propo sed use	Comments
RDO1.B4	RDO1.60	RDO1XVII5	Body	R?	N/A	7-8	Sieved/ Sorted?	3	Medium	1,1	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside	NO	WC, fingers and scraping (inside)	N/A	mound foundation	Storage?	Nice sample to show tendency on site: scraper inside, fingers? outside
RDO1.I4	RDO1.23	RDO1BXI4	Body	U	N/A	6-7	Sieved/ Sorted?/ Tempered?	2(sg)	Coarse	1,2	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Outside	NO	WC	N/A	mound filling (burnt)	Serving	CrissX inscisions, parallel, like the other ones in the site

C Rims

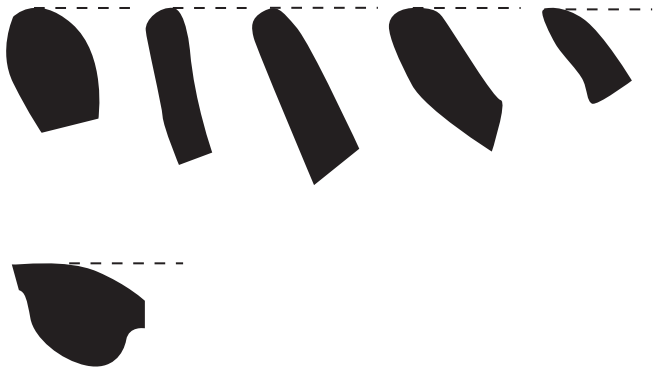
Rim Code	U/R	Shape	Wall ∠ (°)	Base ∠ (°)	(cm)	%	Wall (mm)	Rim profile	Rim ∠ (°)	Lip morphology	Comments
RDO1BXV4.43	R	O	NI		10	8	9	NI	40	Round	Carca
RDO1AVA5.9	NI	O	NI		25	9	12	Excurvated	60	Beveled outside, thinned	
RDO1BXVII8.66	U	CRD	30		23	4	8..5	Direct	30	Beveled inside	
RDO1BXV4.32	R	O	NI		13	5	6	Excurvated	40	Round	Carca
RDO1BXII5.59	NI	NI	30	175	28	5	6	NA	NA	NA	Base with support
RDO2I2.5	U	CC	45		25	3	9	Direct	45	Flat	
RDO2I1.4(1)	NI	NI	NI		20	7	7	Excurvated	30	Thinned	
RDO2I1.4(2)	NI	NI	NI		15	8	12	NI	60	Thickened	
RDO2I1.4(3)	U	CRD	70		25	2	6	Vertical	80	Beveled inside	
RDO2I1.4(4)	U	CRD	65		30	2,5	9	Direct	65	Flat	
RDO2I2	U	CCC					7-8				

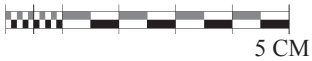
D Decoration & Appendages

MF Group	Sample Code	Part	Incision	Punctuation	Applique	Zoomorphic	Anthropomorphic	Paint	Double slip	Acanaladura	Impression	Comments
RDO1.B4	RDO1B.XV4	Rim	0	0	0	0	0	0	0	0	1	Mini carca rim, impressions 4mm wide, too fragmentary assess, does not look like an olla but inside suggests restricted
RDO1.C4	RDO1B.XV4	Body	1	0	0	0	0	0	0	0	0	Thin chaotic incisions (sub-parallel to each other, <0.5mm, done on LHC (ext surf)
RDO1.E3	RDO1.59	Body (sc)	1	0	1	0	0	0	0	0	1	incisions (<1mm, parallel to the rim and oblique, geometric pattern), + coil (7mm wide) with impressins made with tool with a tip of approx 2mm wide (ext surf)
RDO1.H4	RDO1BXI3	Body	1	0	0	0	0	0	0	0	0	Incisions (<1.5mm) sub-parallel, too fragmentary, on WC (ext surf)
RDO1.I4	RDO1.23	Body (sc)	1	1	1	0	0	0	0	0	0	Applied coil (10mm wide) with punctuations (4.5mm diam), parallel to vessel mouth, then below thin incised lines sub-parallel to each other (<1mm), on LHC (ext surf)
RDO1.I4	RDO1.32	Body	1	0	0	0	0	0	0	0	0	Three perfectly parallel lines (1mm) at same interval (4mm), done on WC, (ext surf)
RDO1.I4	RDO1B.XV4	Body	1	0	0	0	0	0	0	0	0	Sub-parallel thin lines (<1mm), seem on LHC (ext surf)
RDO1.I4	RDO1.23	Body	1	0	0	0	0	0	0	0	0	Bands of sub-parallel thin lines (1mm) oblique to each other, LHC
RDO1.X4	RDO1BXV4	Rim	0	0	0	0	0	0	0	0	1	Carca rim, impressions 2mm wide
						0	0	0	0	0	0	
RDO2.X2	RDO2I1	Body	1	0	0	0	0	0	0	0	0	Suparallel lines 1mm wide, done in LHC , ext surf
RDO2.A4	RDO2I1	Support	0	0	1	0	0	0	0	0	0	Conical support, 14mm diam base, 4mm tip, 17mm high
RDO2.A4	RDO2I1	Support or handle	0	0	1	0	0	0	0	0	0	1 coil, 11mm wide
RDO2.B4	RDO2I1	Support	0	0	1	0	0	0	0	0	0	conical support, 13mm diam base, 4mm tip, 18mm high
RDO2.B4	RDO2I1	Support	0	0	1	0	0	0	0	0	0	conical support, 12mm diam base, 4mm tip, 18mm high
RDO2.B4	RDO2I2	Body	1	0	0	0	0	0	0	0	0	wide, done in WC, internal surface! MOLCAJETE?
RDO2.D4	RDO2.5	Support	0	0	1	0	0	0	0	0	0	(8mm, 18-14mm diameter) buttom support
RDO2.F4	RDO2.1.5	Body	1	0	0	0	0	0	0	0	0	too fragmentary
RDO2.F4	RDO2I1	Body	1	0	0	0	0	0	0	0	0	Suparallel lines 1mm wide, done in LHC , ext surf
RDO2.F4	RDO2I1	Base	0	0	1	0	0	0	0	0	0	Possible support scar, too eroded
RDO2.G4	RDO2I1	Body	1	0	0	0	0	0	0	0	0	Bands of super thin sub-parallel lines, oblique to each other (<0.5mm), inside is either smoked or charred, interesting for functional interpretations
RDO2.I4	RDO2.5	Rim	0	0	1	0	0	0	0	0	0	Applique of oval, 10x7mm right below lip
RDO2.I2	RDO2I2	Body	1	0	0	0	0	0	0	0	0	Subparallel lines, 1mm, LHC
RDO2.K4	RDO2.4.1	Rim	0	0	0	0	0	0	0	0	1	Carca rim 5x8mm impressions, approx 1.5-2mm deep, perfect sample!
Totals			**13**	**1**	**9**	**0**	**0**	**0**	**0**	**0**	**4**	

RDO1

RDO2





Appendix 14

La Aventura ceramic analysis

A Macrofabric

MF group	Texture	Feld-spars	Clay pellets	Red iron	Black iron	Rock inc	Quartz	Grog	Dark mica	Organic	Fre-quency	Sorting	Round-ness	Shape	Orientation	Void shape	Void orient	Core-margin	Hard-ness	Fracture	Feel	Inductio n1 (grs)	Inductio n2 (grs)	Inductio n3 (grs)	Inductio n4 (grs)
LA1.A	Fine	1	1			1	1				<5-10%	VWS	HS/LS	Subrounded/Rounded/Wellrounded/Flat	Subparallel/Oblique/Concentric/Chaotic	Plate/Irregular	Suparallel/Oblique/Concentric/Chaotic	1-3-9-23	S/H	Fine	Smooth	36,9	16,3	0	3826,3
LA1.B	Fine	1	1			1	1		1		10%	VWS	HS/LS	Subangular/Subrounded/Rounded/Wellrounded/Flat	Subparallel/Oblique/Chaotic	Plate/Irregular	Suparallel/Oblique/Chaotic	1-3-9-19	VH	Smooth	Smooth	0	5,4	2,5	160
LA1.C	Fine - Very fine	1				1	1		1		<5-10%	WS	HS/LS	Subangular/Subrounded/Rounded/Wellrounded/Flat	Subparallel/Oblique/Chaotic	Plate/Irregular	Subparallel/Oblique/Chaotic	1-9-17-19	VH	Fine	Smooth	0	5,6	7,2	113,5
LA1.D	Medium	1				1	1		1		10-15%	PS	HS/LS	Subrounded/Rounded/Wellrounded/Flat	Subparallel/Oblique/Concentric/Chaotic	Plate/Irregular	Subparallel/Oblique/Chaotic	2-4-8-10-14-18	H	Fine	Rough	10,4	13,3	0	443,2
LA1.E	Medium	1	1			1	1				15%	MS	HS	Subrounded/Rounded/Wellrounded/Flat	Subparallel/Oblique/Chaotic	Irregular	Chaotic	2-8-10	H/VH	Fine	Smooth	0	13	0	212,8
LA1.OUTLIERS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2,8 50,1	0 53,6	0,9 10,6	194,2 4950

B Macrotrace (petro)

MF group	Sherd code	Strati-graphy	Vessel part	Shape	(cm)	Wall thickness (mm)	Macro-assess-ment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equidistant	Position	Pre-forming	Grain po-sition	Stria-tions	Finishing	Surface treatment	Firing T	Con-text	Pro-posed use	Comments
LA1.A 4(5)	LA1.1	LA1I2	Body	Unrestricted	N/A	12	Guegueste pe related	1	Fine	1,5	N/A	N/A	Yes	Alternate	Pinching, drawing	Inside	No	N/I	LHC, Burnishing (ext)	<750° C	Horizon A1	Serving/Container	LHC preferences, no fire marks, topography is irregular but microtopo is perfect, smooth
LA1.E 4	LA1.22.7	LA1II3	Rim	O	30	12	Guegueste pe related	1	Medium	1.1-1.3	<body	Outside	N/A	Parallel?	Pinching, drawing	Outside/Inside	YES	N/I	LHC, Burnishing (ext)	<750° C	Floor	Cooking/Container	Olla neck with reborde with digital pressure "deco", lookes modelled from coils. Coils in the body are alternate, but they are oblique on the reborde.
LA1.D 4(2)	LA1II3	LA1II3	Body	O	N/A	12.5-14	Guegueste pe related	1	Medium	1,5	N/A	N/A	Yes	Oblique (oi)	Pinching, drawing	Outside/Inside	No	WC (outside)	LHC, Burnishing (ext)	<750° C	Floor	Cooking/Container	Grains prominent inside only, without tool marks, grains inside external surface only. Very nice traces of LHC work on outer surface (take picture and look for the name at Roux).
LA1.A 4(4)	LA1II3	LA1II3	Body	Unrestricted	N/A	10-12	Guegueste pe related	1(sieved?)	Fine	1,3	N/A	N/A	N/A	Alternate	Pinching, drawing	Inside	Yes	LHC?, looks like brushing or rehydrated tool/finger but then LHC gestures obscure it	Burnishing	<750° C	Floor	Serving/Container	Grains inside, both sides, fire mark inside, traces of what looks like brushing (outside), and possibly scraping inside (dont say shaving because grains on the micro creeks are outside)
LA1.A 4(6)	LA1.22.1	LA1II3	Body	CML	20	5-8	Guegueste pe related	1	Fine	0.8-1.5	<body	Inside	Yes	Alternate	Pinching, drawing, shaving	Inside	Yes	LHC, shaving	LHC, Burnishing (ext)	<750° C	Floor	Cooking	Shaving inside lip juncture with body, striations+grainsinside, Fire marks outside
LA1.B 4	LA1.31	LA1II4	Body	Unrestricted	N/A	5,5	Guegueste pe related	1(sg)	Fine	2	N/A	N/A	N/A	Oblique (oi)	Pinching, drawing	Outside/Inside	Yes	WC (brushing)	Smoking + LHC burnishing (ext)	<750° C	Floor	Cooking	Brushing inside, external surface not clear due to heaving LHC smoothing erasing traces
LA1.A 4(3)	LA1.5	LA1II2	Body	Unrestricted	N/A	7,5	Guegueste pe related	1	Fine	1,3	N/A	N/A	N/A	Alternate	Percussion? (grains are not parallel)Pinching, drawing	Outside/Inside	Yes	N/I	LHC, Burnishing	<750° C	Floor	Serving/Container	Fabric imprint inside, after scraping? (it is on the tool trace, grains protuberant), not clear how and when the mold was used... surface topo of this sherd is more regular, but it is a small fragment and inclusions are not oriented parallel (nor voids), so it is hard to assess percussion for preforming
LA1.D 4	LA1II3	LA1II3	Body	Unrestricted	N/A	7	Guegueste pe related	1	Medium	N/A	N/A	N/A	N/A	N/I	Percussion? Pinching, drawing	Outside/Inside	YES	WC, Scraping?	LHC, Burnishing	<750° C	Floor	Serving	Fabric imprint inside! Same trace as sample below, tool mark from shaving or scraping (grains outside on the trace)
LA1.D 4(1)	LA1II3	LA1II3	Body	Unrestricted	N/A	7,5	Guegueste pe related	Outlier	Medium	1,75	N/A	N/A	YES	Oblique (i-o)	Pinching, drawing	Inside	YES	N/I	LHC smoothing, smoked (outside)	<750° C	Floor	Serving	Smoked outside, regular topo
LA1.B 4	LA1.31.5	LA1II4	Rim	O?	20	12	Guegueste pe related	1(sg)	Fine	0.85-1.4	body	Outside	N/A	Parallel?	Pinching, drawing	Outside/Inside	NO	WC?	LHC smoothing	<750° C	Floor	Cooking/Container	Sample very similar to LA1.22.7, but smaller. Olla neck or CRD with reborde with digital pressure "deco", lookes modelled from coils. Coils are very interesting in the neck, there is like a parallel placement to create the reborde
LA1.A 4(2)	LA1.11.11	LA1II3	Rim	CML	40	7	Guegueste pe related	?	Fine	1,2	body	Inside	YES	Oblique (i-o)	Pinching, drawing	Inside	YES	N/I, either scraping or shaving but not clear	LHC, burnishing	<750° C	Floor	Cooking	Sample similar to LA1.22.1, clear fire marks outside. Some sub-parallel voids, but topo is extremely irregular (does not look like percussion)

MF group	Sherd code	Strati-graphy	Vessel part	Shape	(cm)	Wall thickness (mm)	Macro-assess-ment	Petro-graphic Gr.	Grain	Coils (cm)	Lip coil	Position LC	Equidistant	Position	Pre-forming	Grain po-sition	Stria-tions	Finishing	Surface treatment	Firing T	Con-text	Pro-posed use	Comments
LA1.A4(1)	LA1.31.2	LA1II4	Rim	CML?	N/A	7,5	Guegueste pe related	1	Fine	1,8	body	Parallel	N/A	Oblique	Pinching, drawing	Outside/Inside	YES	Not clear, but grains outside in inside surf might indicate WC and also one of those tool mark traces with the grains outside	LHC smoothing	<750° C	Floor	Cooking?	Rim with reborde (different from ollas), looks like a comal, also has the "digital printing" deco. Not clear inside from outside surfaces, too fragmentary
LA1.A4(8)	LA1.22.2	LA1II3	Rim	CR	20	13	Guegueste pe related	1	Fine	1,6	body	Outside	YES	Oblique (oi)	Pinching, drawing	Outside/Inside	YES	N/I	LHC, Burnishing	<750° C	Floor	Cooking/Container	Rim with reborde, same style as others with digital pressure in wet clay on a reborde, rest all LHC work.
LA1.A4(7)	LA1.1.9	LA1I2	Rim	O	10	11	Guegueste pe related	1	Fine	1,2	body	Outside	N/A	Chaotic, hard to tell	Pinching, drawing	Inside	YES	LHC?	LHC, Burnishing	<750° C	Horizon A1	Cooking/Container	Another sample with the reborde style, digital pressure on it, apparent fire marks outside, difference is really good LHC smoothing even of the digital pressure area

C Rims

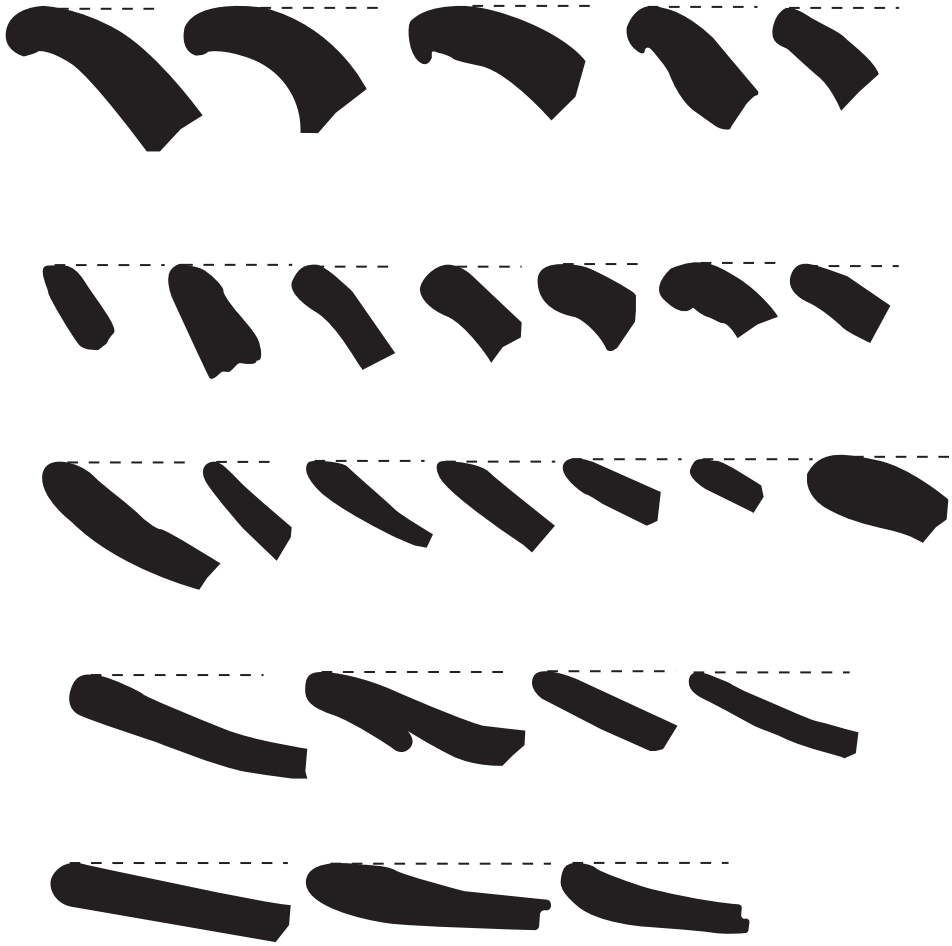
Rim Code	U/R	Shape	Wall ∠ (°)	Base ∠ (°)	(cm)	%	Wall (mm)	Rim profile	Rim ∠ (°)	Lip morphology	Comments
LA1.9	R	O	70		10	4	11	Excurvated	50	Tapered inside	
LA1.11.11	U	CML	5		40	2	7	Direct	5	Round	
LA1.22.2	U	CR	NI		20	2	13	Excurvated	50	Thinned	
LA1.32.1	U	P/CML	20		30	2	9	Direct	20	Thickened, tapered inside	
LA1.22.1	U	CML	20		45	5	8	Direct	20	Thickened inside	
LA1.22.4	NI	CR/O	NI		25	3	10,5	Excurvated	50	Round	
LA1.4.5	U	CRD	60		5	9	6,5	Direct	60	Thinned	
LA1.14.4	NI	CR/O	NI		15	5	8	Excurvated	50	Round	
LA1.23.13	U	CRD	70		15	2	8,5	Excurvated	70	Flat	
LA1.14.3	NI	CR/O	NI		10	9	8	Excurvated	60	Round	
LA1.1.2	R	CRD/O	NI		20	3	6,5	Excurvated	40	Thickened inside, slightly flat	
LA1.23.2	U	CRD	60		25	2	8,5	Direct	60	Slightly beveled both sides	
LA1.1.11.1	R	O	100		5	8	7	Excurvated	50	Round	
LA1.11.16	R	O	100		10	5	8	Excurvated	60	Round	
LA1.11.3	R	O	130		10	8	9	Excurvated	90	Flat	
LA1.23.6	NI	CR/O	80		10	6	11	Excurvated	60	Thinned, flat	
LA1.11.5	U	CRD	60		17	3	10,5	Direct	60	Beveled inside	
LA1.31.3	U	CRD	80		25	2	7,5	Direct	70	Beveled both sides	
LA1.17	R	O	110		15	4	9,5	Excurvated	60	Round	
LA1.24.6	U	CRD	50		5	10	6,5	Direct	50	Thinned	
LA1.1.1	U	CR	80		15	5	10	Direct	60	Thinned outside	
LA1.11.15	U	CRD	40		10	4	8,5	Direct	40	Round	
LA1.4.4	R	O	105		15	5	7	Excurvated	40	Beveled outside	
LA1.24.4	U	CRD	60		30	2	11,5	Direct	60	Thickened, flat	
LA1.23.3	U	CRD	50		25	3	5	Direct	50	Thickened, flat	
LA1.4.1	U	CR	70		25	3	6,5	Outflaring straight	40	Slightly flat	
LA1.22.6	R	O	NI		20	4	9	Excurvated	30	Slightly flat	
LA1.4.3	U	CR	60		20	3	6	Direct	60	Thinned	
LA1.11.?	U	CRD	60		30	4	7	Excurvated	40	Thinned, tapered inside	
LA1.11.12	U	CR	70		15	4	6	Direct	70	Round	
LA1.11.4	U	P/CML	30		35	3	7,5	Excurvated	10	Round	
LA1.4.2	NI	CR/O	75		15	6	10	Excurvated	40	Fkat	
LA1.11.8	U	CRD	40		25	2	9,5	Direct	40	Beveled outside	
LA1.31.1	R	O	90		25	2	8	Excurvated	60	Thinned outside, thickened inside	
LA1.14.5	R	O	NI		5	5	6,5	Excurvated	60	Round	
LA1.23.8	U	CRD	75		12	5	8	Direct	75	Thinned	
LA1.14.2	U	CRD	55		25	2	8	Direct	55	Thickened, flat	
LA1.1.6	U	CRD	70		5	5	7	Slightly excurvated	70	Round	
LA1.11.5	U	P/CML	25		25		9	Direct	25	Beveled inside	
LA1.23.1	U	CRD	60		20	10	11,5	Outflaring straight	40	Beveled outside, flat	
LA1.14.1	U	CRD	40		30	3	8	Outflaring straight	15	Beveled outside	
LA1.11.10	R	O	110		15	10	9	Excurvated	40	Thinned	
LA1.24.1	U	P/CML	10		35	3	9	Direct	10	Thinned	
LA1.11.2	U	P/CML	20		40	3	9	Direct	20	Round	
LA1.11	U	CRD	75		10	4	6	Direct	75	Round	
LA1.22.7	R	O	85		30	2	12	Excurvated	60	Thinned inside, slightly tapered inside, flat	
LA1.31.5	U	CRD/O	70		20	1	12	Excurvated	40	Round	
LA1.31.4	U	CRD	70		27	3	10	Excurvated	70	Round	
LA1.23.12	U	CRD	60		20	2	7	Direct	60	Round	
LA1.23.9	U	CRD	60		10	5	7	Outflaring straight	35	Thinned	
LA1.23.5	U	CR	85		15	4	6	Outflaring straight	50	Round	
LA1.12.3	NI	NI	NI		20	3	8	NI	40	Round	

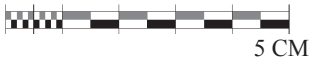
D Decoration & Appendages

MF Group	Sample Code	Part	Incision	Punctuation	Applique	Zoomorphic	Anthropo morphic	Paint	Double slip	Acanaladura	Impression	Comments
LA1.A4	LA1.22	Neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way
LA1.A4	LA1.23	Neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext surface, reinforcement placed, somehow remminiscent of carca style
LA1.A4	LA1II3	Neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way
LA1.A4	LA1.31	Neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext surface, reinforcement placed, somehow remminiscent of carca style
LA1.A4	LA1.11	Neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way
LA1.A4	LA1.22.4	Neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way
LA1.A4	LA1.1.4	Neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way
LA1.A2	LA1.11	Rim/Neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way +black slip
LA1.A4	LA1.14	Handle	0	0	1	0	0	0	0	0	1	cyllindrical handle, 15mm coil
LA1.A4	LA1.11.14	Neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
LA1.A2	LA1.1.31.1	Rim/neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way +black slip
LA1.A2	LA1.31	Rim/neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way +black slip
LA1.A4	LA1.1.5	Rim/neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
LA1.A4	LA1.11.?	Rim/neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
LA1.A4	LA1.1.2	neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way. this sample is particular because the reinforcement and pinched deco seem to be placed on the juncture between neck and body, not with rim!
LA1.A4	LA1.4.4	Rim/neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way
LA1.A4	LA1.22.6	Rim/neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way
LA1.A4	LA1.1.4	Rim/neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way
LA1.A4	LA1.14.4	Rim/neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way
LA1.X4	LA1II3	body	0	0	0	0	0	1	0	0	0	glazed white fragment
LA1.X1	LA1II3	body	0	0	0	0	0	1	0	0	0	white paint
LA1.E2	LA1.31	neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way+black slip
LA1.E4	LA1II3	neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
LA1.D4	LA1.11	neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way
LA1.D4	LA1.5	neck	0	0	0	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, remminiscent of carca style in a way
LA1.D4	LA1II3	neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
LA1.D4	LA1II3	neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
LA1.D4	LA1.22.3	Rim/neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
LA1.X5	LA1II3	Neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
LA1.C4	LA1V3	Neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way, at the juncture between neck and body
LA1.B4	LA1.31.4	Rim/neck	0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
LA1.B3	LA1.23.12	RIm	0	0	0	0	0	0	0	0	0	slip on lip only (black)
LA1.A4	LA1.1.9		0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
LA1.B4	LA1.31.5		0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
LA1.E4	LA1.22.7		0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
LA1.A4	LA1.22.2		0	0	1	0	0	0	0	0	1	finger impressions on wet clay done on the neck, ext suface, reinforcement, remminiscent of carca style in a way
Totals			**0**	**0**	**20**	**0**	**0**	**2**	**0**	**0**	**33**	

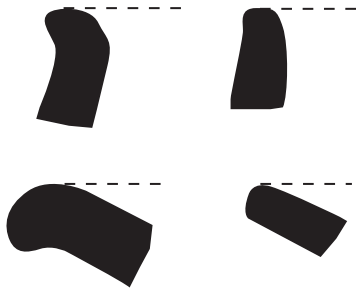
LA1

LA 1

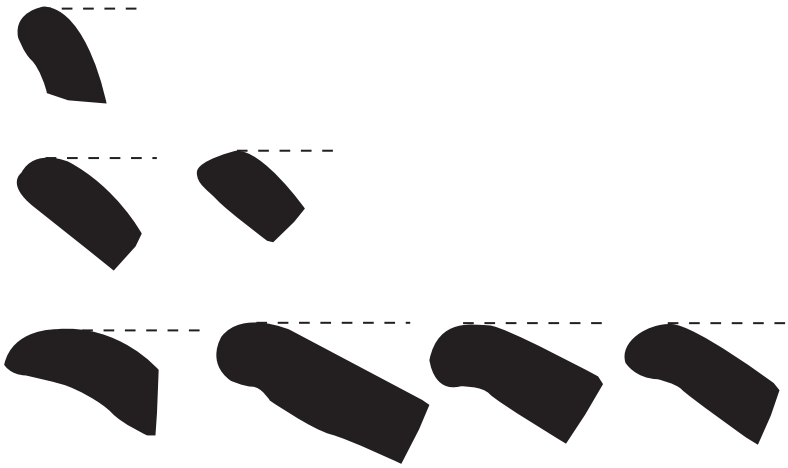


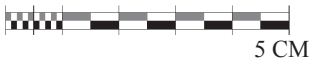


LA 2



LA 3





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Summary

This research explores several problematic issues for the archaeological discipline in general and also for the particular archaeological narratives in southern Central America. To begin with, this manuscript tackles the question of Western and Cartesian perspectives of time, as found in the traditional practice of chronology building. Then, it challenges the dominant notions of change and materiality to compose a chronological narrative that connects different materialities. Here, materiality is seen as the embodiment of situated and incorporated gestures. This definition allows a portrayal of how the vibrant and vital experiences of the different communities of potters are entangled with their manufacturing practices in the valley of Juigalpa, central Nicaragua, since cal 300 CE through to today.

Previous chronological efforts in the research region were designed, executed, and narrated from a Mesoamerican point of view, predominantly portraying the research region as the southeasternmost border of that cultural area. However, the innovative theoretical, methodological, and technical approach of this book explores central Nicaragua first from the local universes of possibilities, and only then relating these to other regions of study. Results indicate that people in the valley of Juigalpa engaged with different communities, constellations, and networks of practices. This connected them to groups in faraway places in present-day Honduras and Costa Rica. In spite of these strong ties to lands beyond their cultural horizon, people in the valley of Juigalpa maintained their own ways of doing things, while also incorporating new ideas and practices.

In this text, the question of time and chronology-building in archaeology is analyzed from different perspectives. First, it deals with the linear conception of time; second the practice of ignoring the palimpsestic ontology of materiality, translated in the use of formal attributes of ceramic vessels (decoration and shape), to infer social and cultural change. Third, the isolation of ceramic chronologies to a deep past; neglecting the transformation of the production and uses of ceramic objects today. One of the main problems, then, of traditional chronology-building efforts is the denial of the present, which is directly connected with the denial of the present tense of archaeological practices, and the fact that the materials that we use to narrate the past are actually temporal (and other types of) palimpsests.

This manuscript aims to challenge the paradigm of time and materiality as commonly used in archaeology, and to propose a new way of narrating vital chronologies. The point of departure for this endeavor is a *longue durée* perspective on the geographical unit of the valley of Juigalpa. A chronology including five different intervals is presented, through viewing archaeological materials—especially ceramics—as complex and embodied palimpsests; as the bundling of unfolding traces. The intervals run from the earliest traces of human practices through to the present. This research was conducted under the auspices of the *Proyecto Arqueológico Centro de Nicaragua* (PACEN), directed by Alexander Geurds. The chronology introduced in this book is based on more than a year of archaeological fieldwork in Nicaragua, including systematic surface survey, stratigraphic excavations, and ethnographic work; together with extensive laboratory work in The Netherlands.

Nederlandse Samenvatting

Dit onderzoek verkent verschillende problematische kwesties voor de archeologische discipline in het algemeen en voor specifieke archeologische narratieven in zuidelijk Midden-Amerika. In de eerste plaats behandelt dit manuscript de kwestie van de westerse en cartesiaanse tijdsperspectieven, zoals gangbaar in de archeologische praktijk van de constructie van chronologieën. Vervolgens worden de hierdoor bereikte opvattingen gekoppeld aan specifieke begripsvorming rondom verandering en materialiteit teneinde een chronologisch narratief samen te stellen dat verschillende vormen van materialiteit met elkaar verbindt. Materialiteit wordt hier gezien als de belichaming van gesitueerde en geïncorporeerde fysieke handelingen. Deze definitie van materialiteit verschaft inzicht in de verstrengeling van de energieke en vitale ervaringen van de verschillende gemeenschappen van pottenbakkers met productiepraktijken in de vallei van Juigalpa, centraal Nicaragua, sinds cal 300 CE tot nu.

Voorgaand onderzoek naar archeologische chronologieën in de onderzoeksregio werden ontworpen, uitgevoerd en betoogd vanuit het standpunt van het Mesoamerikaanse studieveld, waarbij de onderzoeksregio voornamelijk werd gekenschetst als de zuidoostelijke grens van dat culturele gebied. De innovatieve theoretische, methodologische en technische benadering in dit proefschrift verkent echter eerst het centrum van Nicaragua vanuit de lokale universa van mogelijkheden, en relateert deze mogelijkheden slechts in tweede instantie aan andere velden van studie. De resultaten geven aan dat mensen in de vallei van Juigalpa verbanden aangingen met verschillende zogeheten *communities of practices*, *constellations of practices*, evenals *networks of practices*. Dit verbond hen met verafgelegen groepen in het huidige Honduras en Costa Rica. Ondanks deze sterke banden met gebieden voorbij hun culturele horizon, behielden de gemeenschappen in de vallei van Juigalpa hun eigen manier van handelen, waarbij eveneens nieuwe ideeën en praktijken geïncorporeerd worden.

In dit proefschrift wordt de kwestie van de archeologische opbouw van tijd en chronologie vanuit verschillende perspectieven geanalyseerd. Ten eerste wordt een discussie gepresenteerd over de lineaire opvatting van tijd. Als tweede volgt een beschouwing van de praktijk van het negeren van de palimpsestische ontologie van de materialiteit—vertaald in het gebruik van formele attributen van vaatwerk (decoratie en vorm)—teneinde sociale en culturele verandering af te leiden. Ten derde, het beschouwen van aardewerk chronologieën als uitsluitend behorende tot het diepe verleden; waarbij de transformaties van de productie en gebruik van aardewerken objecten hedendaags worden genegeerd. Hieruit volgt dat een van de primaire problemen van traditionele archeologische chronologieën gerelateerd is aan de ontkenning van het heden. Dit inzicht is nauw verbonden met de ontkenning van tegenwoordige tijd in de taal die de archeologische praktijken beschrijft, alsmede met het feit dat de materialen die we gebruiken om een narratief te maken over het verleden feitelijk tijdelijke “palimpsesten van tijd” betreffen.

Dit manuscript beoogt het paradigma van tijd en materialiteit, zoals veelvuldig toegepast in de archeologie, uit te dagen en een nieuwe manier voor te stellen om narratieven over vitale chronologieën te bereiken. Het uitgangspunt voor dit streven is een *longue durée* perspectief op de geografische omgeving van de vallei van Juigalpa. Een chronologie met vijf verschillende intervallen wordt gepresenteerd, door het beschouwen van archeologisch materiaal - met name aardewerk - als complexe en belichaamde palimpsesten; als de

bundeling van ontvouwende sporen. De intervallen omvatten de vroegste sporen van menselijk handelen in de vallei, tot aan de huidige tijd. Dit onderzoek werd uitgevoerd onder auspiciën van het *Proyecto Arqueológico Centro de Nicaragua* (PACEN), onder leiding van Alexander Geurds. De chronologie in dit boek is gebaseerd op meer dan een jaar archeologisch veldwerk in Nicaragua, waaronder systematisch oppervlakteonderzoek, stratigrafische opgravingen en documentatie van etnografische gegevens; in combinatie met uitgebreid laboratoriumonderzoek in Nederland.

Resumen

Esta investigación explora varios temas problemáticos para la disciplina arqueológica en general y para las narrativas arqueológicas particulares del sur de América Central. Para empezar, este manuscrito aborda la cuestión de las perspectivas occidentales y cartesianas del tiempo, ejemplificadas en la práctica tradicional de elaboración de cronologías. Luego, vincula estas perspectivas con nociones específicas de cambio y materialidad para componer una narrativa cronológica que conecta diferentes materialidades. Aquí, la materialidad se define como la in-corporación de gestos aprendidos en contextos sociales, que permiten retratar las experiencias vibrantes y vitales de las diferentes comunidades de alfareros que han entrelazado sus prácticas de manufactura con el valle de Juigalpa, en el centro de Nicaragua, desde cal 300 CE hasta hoy.

Los esfuerzos cronológicos anteriores en la región de investigación fueron diseñados, ejecutados y narrados desde un punto de vista mesoamericano, retratando predominantemente la región de investigación como la frontera más sudoriental de esa macroárea cultural. Sin embargo, el enfoque teórico, metodológico y técnico innovador de este libro explora el centro de Nicaragua primero desde los universos de posibilidades locales y sólo después relacionándolos con otras regiones de estudio. Los resultados indican que los habitantes del valle de Juigalpa formaron parte de diferentes comunidades, constelaciones y redes de prácticas. Esto los conectó con grupos de lugares lejanos en la actual Honduras y Costa Rica. A pesar de estos fuertes lazos con tierras más allá de su horizonte cultural, los habitantes del valle mantuvieron sus propias formas de hacer las cosas, a la vez que in-corporaban nuevas ideas y prácticas.

En este texto, la cuestión del tiempo y la elaboración de cronologías en la disciplina arqueológica se analiza desde diferentes perspectivas. En primer lugar, se aborda la concepción lineal del tiempo; en segundo lugar, la práctica de ignorar la ontología palimpsética de la materialidad, traducida en el uso de atributos formales de los recipientes de cerámica (decoración y forma) para inferir cambios sociales y culturales. En tercer lugar, la encapsulación de las cronologías cerámicas en el pasado, descuidando cómo la transformación de la producción y los usos de los objetos de cerámica hoy en día también puede echar luz a nuestra propia historia. Uno de los principales problemas de los esfuerzos de construcción de cronologías tradicionales es la negación del presente, que está directamente relacionada con la negación del tiempo presente de las prácticas arqueológicas y el hecho de que los materiales que utilizamos para narrar el pasado son en realidad palimpsestos temporales (y de otros tipos).

Este manuscrito tiene por objeto principal desafiar el paradigma tradicional empleado en la creación de cronologías en la arqueología y proponer una nueva forma de narrar el devenir histórico de manera vital. El punto de partida de este esfuerzo es una perspectiva de larga duración aplicada a la unidad geográfica del valle de Juigalpa, en el centro de Nicaragua. Se presenta una cronología que incluye cinco intervalos diferentes, que fue elaborada a través de la observación de las huellas técnicas observadas en materiales arqueológicos—especialmente la cerámica—como palimpsestos complejos e in-corporados; como el despliegue de huellas entrelazadas, Estos intervalos parten desde los primeros rastros de las prácticas humanas hasta el presente. Esta investigación se llevó a cabo bajo los auspicios del Proyecto Arqueológico Centro de Nicaragua (PACEN), dirigido por Alexander Geurds. La cronología que se presenta en este libro se basa en más de un año de trabajo de campo arqueológico en Nicaragua, que incluye el estudio sistemático de la superficie, las excavaciones estratigráficas y el trabajo etnográfico; seguido por un extenso trabajo de laboratorio realizado en los Países Bajos.

Curriculum Vitae

Natalia Ruth Donner (Rosario, August 27th, 1981) is an Argentinian-Mexican archaeologist who has worked in Mexico, Panama, Nicaragua, and Argentina for over 15 years. Before completing her PhD at Leiden University, Donner obtained a BA in Archaeology (2006) at Universidad Veracruzana (Mexico) and then a Masters in Mesoamerican Studies (2015) at UNAM, Mexico. Since 2003, she participated in several archaeological projects, particularly in the Mexican Gulf Coast; and between 2008 and 2011 she directed Proyecto Arqueológico El Carrizal, in South-Central Veracruz. Through that project, she made contributions to the regional ceramic sequence, settlement patterns history, as well as implemented a public archaeology program. In addition, her team excavated and conserved the earliest ball court in Veracruz, dated to the end of the Proto-Classic (100 BCE – 100 CE) and the beginning of the Early Classic (100 – 300 CE). Later, she collaborated with the Smithsonian Tropical Research Institute in Panama, and then joined the Education Department at Frank Gehry's Biodiversity Museum, also in Panama City, where she engaged in the teacher-training program and focused on developing school materials related to archaeology.

Her work interweaves archaeological theory, methods, and practice, questioning the epistemological and colonial foundations of the discipline as well as stressing its deep anthropological roots. She has explored the contributions of philosophers such as Bachelard, Foucault, and Agamben to analyze the construction of discourses in archaeology. She also studies materiality, seen as the embodiment of socially learnt practices and power relationships, and how these gestural traces, especially incorporated in fired clay, can aid in the construction of chronological narratives. She has written on the subject of radiocarbon dating, the ancient Mexican practice of the ballgame, ceramic technologies in South-Central Veracruz and Central Nicaragua, landscape archaeology, conservation of archaeological sites in Mexican urban contexts, among other topics. Since 2014, she has actively collaborated with the Proyecto Arqueológico Centro de Nicaragua (PACEN), directed by Alexander Geurds (Leiden University). The main results of her work with PACEN are culminated within this book. Currently she is lecturer at the Faculty of Humanities, Leiden University and co-director of the multidisciplinary project Darien Profundo, which explores the deep history of human-environmental entanglements at the land bridge of the Americas, the Isthmus of Panama.