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Connecting crafting communities: reconstructing interactions between communities in and out of Cyprus in the early third millenium BC

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CHAPTER 5:

Pottery Production in Late
Chalcolithic Cyprus:
A Macroscopic Study

Chapter 5 — Pottery Production in Late Chalcolithic Cyprus: A Macroscopic Study

5.1. An Overview of the Assemblages

For this study, Late Chalcolithic pottery from four sites across Cyprus was studied macroscopically, namely: *Chlorakas-Palloures*, *Kissonerga-Mosphilia*, *Ambelikou-Agios Georghios* and *Politiko-Kokkinorotsos*. Then, a small sample was selected for compositional and technological study.

The main aims are to investigate:

1. Late Chalcolithic pottery production and technologies and their degree of variability at a local, regional, and inter-regional level.
2. The compositional and technological characterization of the dominant red and/or black pottery types selected, which represent the bulk of local production at each site.
3. The mode of organization of pottery production, since the Late Chalcolithic is a period of a marked increase in standardization in both vessel morphology and composition (Bolger & Webb, 2013, p. 45).

In this chapter, an overview of the sites and wares selected is presented, followed by the macroscopic analysis.

Comparing and constructing a multi-site typology of Late Chalcolithic pottery is a challenging task, since the assemblages are characterized by regional variability, and researchers have used different terminologies in their research and publications (Peltenburg, 1991c, p. 11; Bolger & Webb, 2013, p. 46). Different terms, classification criteria and methods have been used by pottery researchers, while the amounts of pottery from the sites vary considerably. Moreover, the currently known well-investigated Chalcolithic sites are unevenly spread across Cyprus, with the vast majority of them being along the west and south coasts of the island. Also, most sites in Cyprus do not have deep stratigraphy, so they are not multi-period sites (Frankel *et al.*, 2013a, p. 15). These sites have been excavated to different extents, by various projects and with diverse methodologies. Some of them are published in considerable detail (e.g., *Kissonerga-Mosphilia*), and some only in brief (e.g., *Ambelikou-Agios Georghios*). It should be noted that in this thesis, the following geographical distinction is followed: *Chlorakas-Palloures* and *Kissonerga-Mosphilia* are situated in western Cyprus; *Ambelikou-Agios Georghios* in northwestern Cyprus; and *Politiko-Kokkinorotsos* in central Cyprus. This division is in accordance with divisions made by previous studies of settlement distribution in Prehistoric Cyprus (Georgiou, 2007; Laoutari, 2023).

5.1.1. Western Cyprus: *Chlorakas-Palloures* and *Kissonerga-Mosphilia*

The Ktima Lowlands, an area north of the modern-day city of Paphos, is home to a cluster of prehistoric sites including the Chalcolithic *Lemba-Lakkous*, *Kissonerga-Mylouthkia*, and *Chlorakas-Palloures*, the later *Kissonerga-Skalia* and *Kissonerga-Ammoudhia*, which date up to the Middle Bronze Age, and the Late Bronze Age *Maa-Palaeokastro* (Peltenburg, 1985; 1998; Düring *et al.*, 2019; Crewe, 2014; Graham, 2013; Karageorghis, 1988; Figure 30). For this study, pottery from *Chlorakas-Palloures* and *Kissonerga-Mosphilia* has been analyzed.

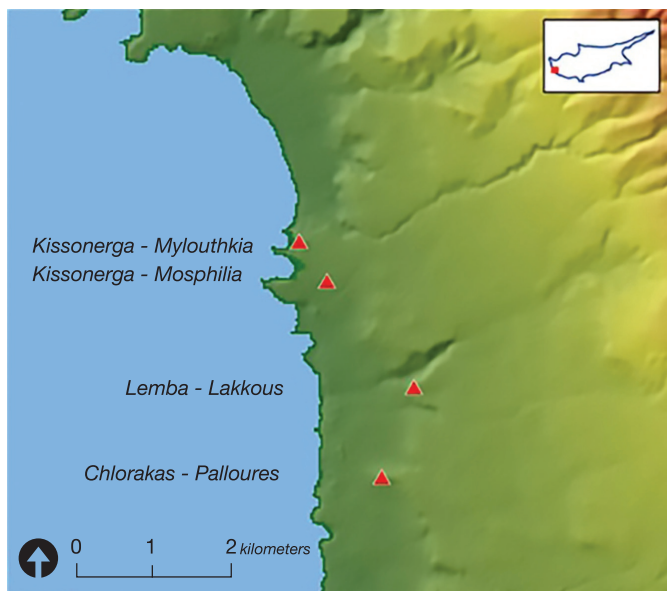


Figure 30: Overview of trenches at Chlorakas-Palloures (by Victor Klinkenberg)

To begin with, Chlorakas-*Palloures* is a settlement ascribed to both Middle Chalcolithic and Late Chalcolithic. It was first identified in the 1950s. For the Paphos District Survey it was investigated by Sophocles Hadjisavvas in 1975, and later by the Western Cyprus Survey in 1999 (Peltenburg 1979, p. 79; Düring *et al.* 2019). Excavations are being carried out by the Palloures Archaeological Project of Leiden University since 2015, under the direction of Bleda Düring. The first three years of excavation (2015-2017) took place in Plot 568, as a rescue mission. Meanwhile, in 2017, the Paphos Museum opened some trial trenches in adjacent Plot 355. Since 2019, both plots have been acquired by the Department of Antiquities of Cyprus and are now investigated by the Palloures Archaeological Project (Figure 31). Up to 2021, when sampling for this study took place, 21 trenches had been excavated, revealing 18 round houses, 15 burials, and vast amounts of pottery, chipped stone tools, ground stone and other artefacts (Düring *et al.* 2018; 2019; 2021). The pottery is being processed by Charalambos Paraskeva and Maria Hadjigavriel (Hadjigavriel 2019; 2021). Therefore, the macroscopic analysis of pottery from this site in this study concerns the totality of the assemblage recovered, as it has been studied during fieldwork seasons of 2015-2021.

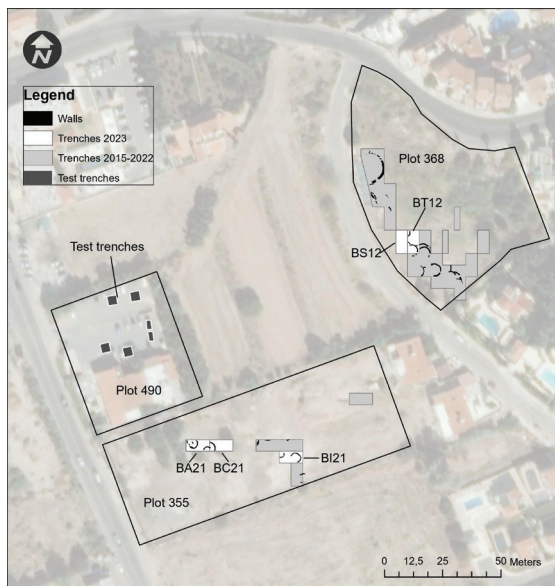
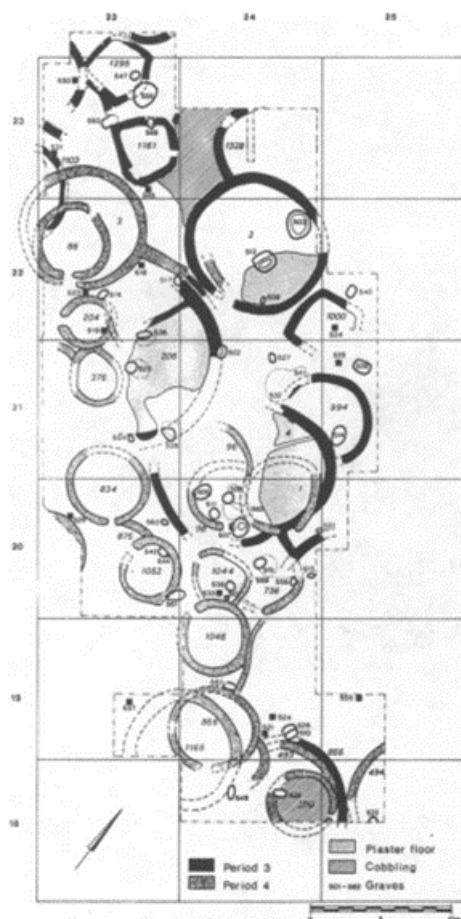


Figure 31: Overview of trenches at Chlorakas-Palloures (by Victor Klinkenberg)

This study includes the dominant ceramic types at Chlorakas-*Palloures* during the Late Chalcolithic. Samples from different Late Chalcolithic compounds/buildings within the settlement are included to investigate intra-site compositional and technological homogeneity or variability. Each ware is represented by multiple examples, including different vessel shapes, predominantly various types of bowls and storage jars. Since the excavation is ongoing, sub-periods of settlement occupation have not been finalised and the pottery analysis from various trenches has not been completed. As a result, the Late Chalcolithic is treated as a whole, and samples are taken from safely dated Late Chalcolithic contexts. The dominant Late Chalcolithic wares in the ceramic site assemblage, are the Red and Black Stroke-Burnished Ware (RB/B), Spalled Ware (SW), and Late Chalcolithic Red Monochrome Ware (LChalRM).



When it comes to these two sites, my study has focused on two wares: the Red and Black Stroke-Burnished Ware (RB/B), which has been presented in Chapter 3, and the Spalled Ware (SW), which is a very hard pottery ware with pinkish-buff clay and dark inner core. Surfaces are often pock marked (spalled) and covered with a thinly applied dull red to grey-black and/or beige slip. Finally, only from Chlorakas-*Palloures*, the Late Chalcolithic Red Monochrome Fabric (LChalRM) is studied, a hard pottery ware with red/orange monochrome surfaces. It resembles a pottery type which is found in big quantities in the Polis region in northern Paphos, at sites like Makounta-*Voules*, and corresponds to what is referred to in the literature as Coarse Painted Monochrome (Maliszewski, 2013, p. 28; Lisa Graham after personal communication). At Chlorakas-*Palloures* it represents ca. 14% of the Late Chalcolithic pottery found at the site.

5.1.2. Northwestern Cyprus: Ambelikou-Agios Georghios

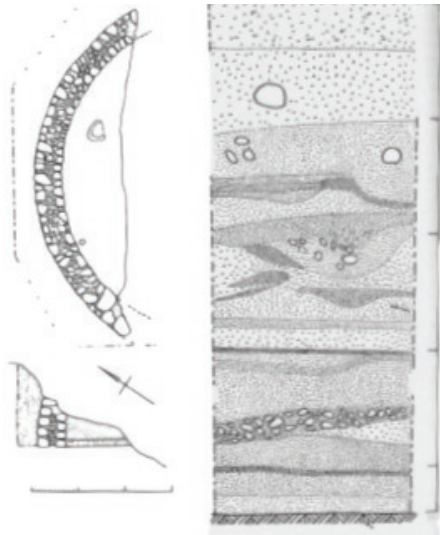


Figure 33: Architecture and section showing deposit at Ambelikou-Agios Georghios (Dikaïos, 1962, p. 142)

Ambelikou-Agios Georghios is in the northern part of Nicosia District, west of the Agios Liontis River and close to the modern-day village of Ambelikou (VD823868 XXVII:9: West of 226 according to Stanley-Price 1979, 91 N. 2). It has been named after a church nearby dedicated to Agios Georghios, and it was partially exposed during the construction of a road in the 1940s (Dikaïos, 1962, p. 141). The site was first reported by Anastasiou in 1942. In the same year, Dikaïos conducted a trial excavation on behalf of the Department of Antiquities, comprised of only by one 2 x 2 m trench with depth of deposit 4.60 m, uncovering floors and debris layers. Later, in 1953, Dikaïos excavated an area of 26m² where the modern road cuts the site and revealed part of a curvilinear stone structure (Dikaïos, 1962, pp. 141-149; Stanley-Price, 1979, p. 91 N. 2; Figure 33). The excavations and the pottery were published by Dikaïos (1962), while the pottery has been analysed by Gjerstad (1980), Peltenburg (1991c) and Paraskeva (2015).

When Dikaïos excavated Ambelikou-Agios Georghios, he argued that the limited scale of the excavations prevented him from identifying phases of occupation, and thus he relied only on relative chronology based on pottery, dating the site primarily to the Late Chalcolithic (Dikaïos, 1962, p. 147). During both the 1942 and the 1953 excavations, pottery and other artefacts were collected in spits of 20 cm, from the surface to bedrock. The finds of each layer were stored in wooden trays, which were named accordingly (e.g. Tray 170 1942 100-120 cm). Today at the Cyprus Museum, there are 31 trays, containing ca.3900 sherds along with flint, ground stone tools and animal bones (Figure 34).

In the publication of the site, Dikaïos (1962, pp. 143-147) identified seven wares: Red Lustrous Ware, Red Black Lustrous Ware, Red-on-White Ware, Plain White Ware, Red Slip Ware, Black Polished Ware and Coarse Ware.

Figure 34: Overview of the Ambelikou-Agios Georghios material at the Cyprus Museum (by Maria Hadjigavriel)

AMBELIKOU-AGIOS GEORGHIOS ASSEMBLAGE DIVISION	
CONTEXT	TRAYS
Surface finds (1942 III22 III28)	Trays 196 and 195
440-460 cm	Trays 194 and 194A
420-440 cm	Trays 193 and 193A
400-420 cm	Trays 192 and 192A
380-400 cm	Trays 191, 191A, 190 and 189
360-380 cm	Trays 188, 187, 186 and 185
340-360 cm	Trays 184 and 183
320-340 cm	Trays 182 and 181
300-320 cm	Tray 180
280-300 cm	Tray 179
260-280 cm	Tray 178
240-260 cm	Tray 177
220-240 cm	Tray 176
200-220 cm	Tray 175
180-200 cm	Tray 174
160-180 cm	Tray 173
140-160 cm	Tray 172
120-140 cm	Tray 171
100-120 cm	Tray 170

For the purposes of this study, I have studied this assemblage macroscopically in the summer of 2021, with permission from the Department of Antiquities of Cyprus, and in the framework of the Parks Fellowship at the Cyprus American Archaeological Research Institute (CAARI). I studied the material again in February 2022 to conduct the sampling for archaeometric analysis. The assemblage was studied macroscopically using a 10x hand lens and a digital USB microscope. Both these tools helped me collect information about surface treatment and fabric of each sherd to identify the wares described by Dikaïos, and to collect information on the technology of production. Every tray was studied separately, and data were input into a Microsoft Excel file. For every tray, pottery was sorted and ascribed to these categories: Abraded/Unclassified (BA/U); Late Pottery (Late); Red Lustrous Ware (RL); Red Black Lustrous Ware (RBL); Red Black Stroke-Burnished Ware (RB/B); Spalled Ware (SW); other Chalcolithic Wares (RW/RM); Coarse Ware (CW).

This analysis has showed that in a total of 3907 sherds, 24% of the pottery from Ambelikou-Agios Georghios is badly abraded/unclassified or belongs to later periods. This is to be expected given the type and time of the excavation. Of the Chalcolithic wares, RL and RBL are the most popular, comprising the 23% and 28% of the assemblage respectively. Finally, 3% seems to be possible imports from the Paphos Region, namely RB/B and SW (see Figures 35 and 36 below).

Figure 35: Overview of pottery at Ambelikou-Agios Georghios (created by Maria Hadjigavriel)

POTTERY AT AMBELIKOU-AGIOS GEORGHIOS

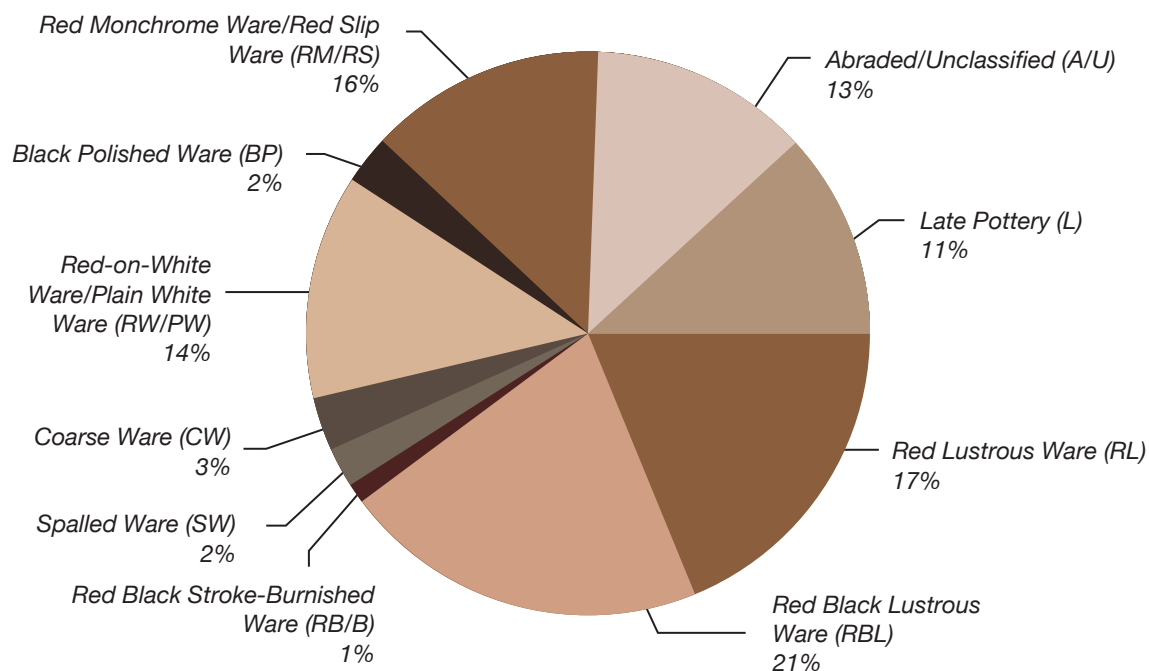
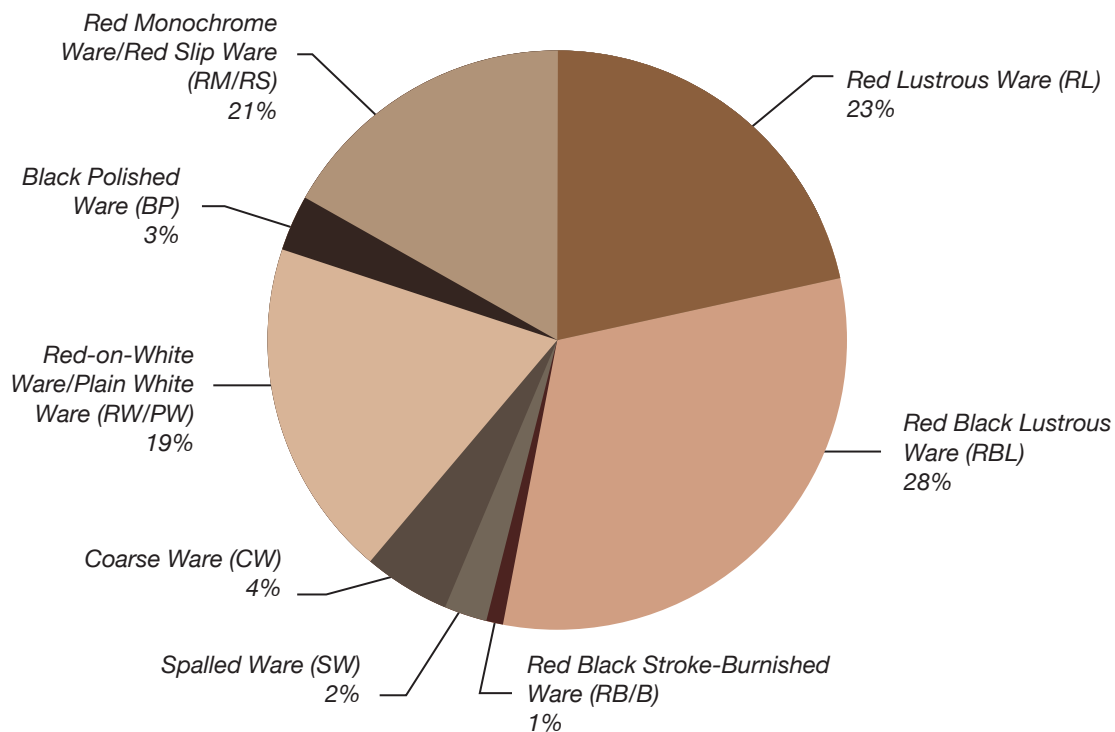


Figure 36: Overview of Chalcolithic wares at Ambelikou-Agios Georghios (created by Maria Hadjigavriel)

CHALCOLITHIC WARES AT AMBELIKOU-AGIOS GEORGHIOS



During this analysis it has been observed that wares which are ascribed to the Middle Chalcolithic, namely Red-on-White Ware, Plain White Ware and Red Monochrome/Red Slip occur in smaller quantities and mainly at the deepest layers. On the other hand, the presence of Late Chalcolithic wares such as the RL and RBL increases in the upper layers, at times reaching the 52% of the assemblage. Therefore, Dikaïos' classification of the excavated layers at site primarily dating to the Late Chalcolithic is confirmed (Dikaïos, 1962, pp. 147-148). Of the Chalcolithic wares four were selected for further analysis: RL and RBL because of they comprise most of the pottery production at the site; and RB/B and SW because they are possibly imports from the western part of the island. In addition to these, some sherds of CW were selected for analysis to cross-check local clays. Sherds that belong to the selected wares were catalogued in more detail. For every tray, besides their total numbers, the numbers of the following were recorded: body open; body closed; rim open; rim closed; base open; base closed; handle/lug/spout.

5.1.3. Central Cyprus: Politiko-Kokkinorotsos

Politiko-Kokkinorotsos is a small site west of the modern-day village Politiko, in a valley in central Cyprus. It is the only known Chalcolithic site in that area, dated to ca. 2880-2600 BC. It was first identified by the Sydney Cyprus Survey Project in the 1990s as Politiko-Fournia (Given & Knapp, 2003, pp. 192-7, SCY 200, CS 2907). In 2006 and 2007 it was excavated by David Frankel and Jennifer Webb of La Trobe University, revealing ca. 550 m² (Webb *et al.* 2009a; Frankel *et al.*, 2013b; Figure 37). First, in 2006, ten 1x2 m² trenches and two 1x3 m² trenches were opened. No structures were found besides a circular oven-pit with basal ash and hearth stones. Large quantities of bone and pottery were recovered and a radiocarbon sample of charcoal which gave the date of 2880-2610 cal BC. The excavation continued in 2007.

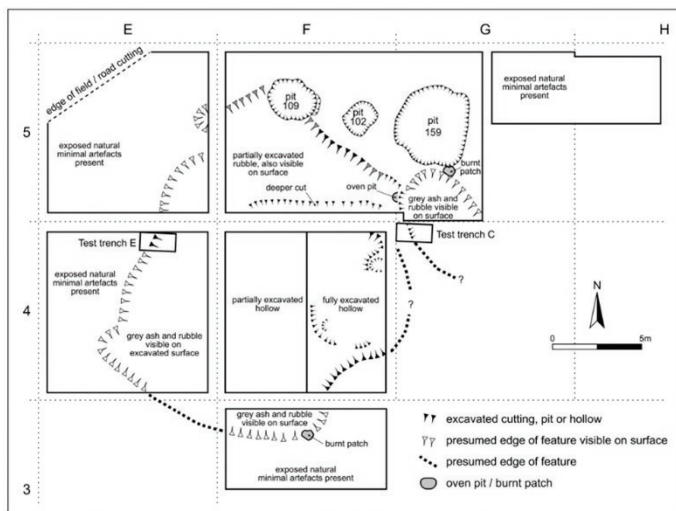


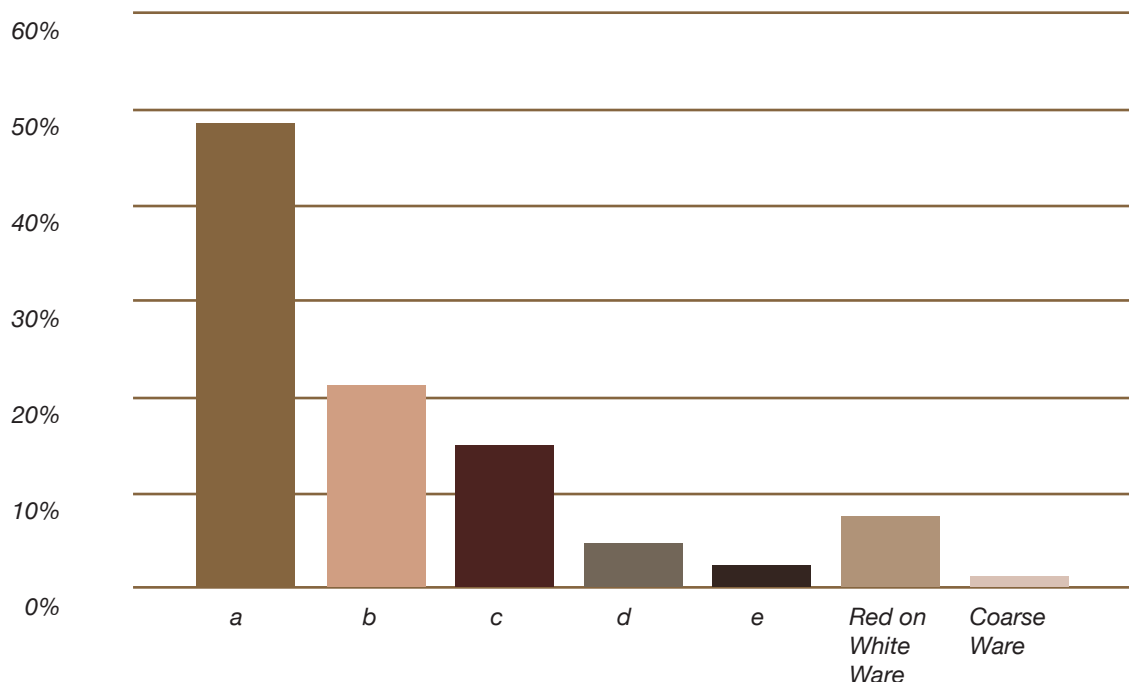
Figure 37: Plan of main area of excavations at Politiko-Kokkinorotsos (after Webb *et al.*, 2009, p.194)

This excavation revealed a site of different character. Architecture, burials or activity areas are almost completely absent. Faunal remains of fallow deer in big quantities and chipped stone suits intensive meat exploitation, while the archaeobotanical remains and the ground stone tools indicate that domesticated plants were processed and consumed at the site. Therefore, the excavators have suggested that Politiko-Kokkinorotsos was a seasonal hunting station and not a permanent settlement (Webb *et al.*, 2009a, p. 189; Frankel *et al.*, 2013b, p. 94). Overall, because of the poor state of preservation at the site, it is impossible to reconstruct the size, location, or lifespan of the dwellings, or taphonomy of the finds. Therefore, in publications, the material from Politiko-Kokkinorotsos is treated as a single analytical entity (Webb *et al.*, 2009a, pp. 194-195).

At Politiko-Kokkinorotsos, 54.827 sherds were recovered, of which 1133 were kept as diagnostics. No complete vessels were found. As mentioned above, the spatial or temporal variability of the material cannot be distinguished. Webb (*et al.*, 2009a, p. 196) has distinguished seven distinct pottery varieties, which belong to three broad categories: Painted, Coarse and Unpainted. To begin with, the Painted variety is comprised primarily of the RW. Subsequently, the Coarse variety includes low-fired flat-based pans or trays, common in all Middle and Late Chalcolithic sites. Finally, the Unpainted varieties, namely Red Monochrome, Monochrome Black and Bichrome, are the most common (Figure 38). They have overlapping characteristics and they seem to belong to one pottery tradition. These Unpainted varieties are separated into five macroscopic fabrics, based on interior and exterior slip thickness and lustre, fabric texture and hardness, and the quantity of inclusions. For the purposes of this project Fabric A, Fabric B and Fabric D are studied, because of their large quantities but also their similarities to wares selected from other sites included in this study. These correspond to the Red Lustrous (RL) and Red Black Lustrous (RBL), as they have been presented in Chapter 3. Additionally, the Coarse variety (CW) is studied, to cross-check the local clays.

Figure 38: Table showing ware distribution at Politiko-Kokkinorotsos (created by Maria Hadjigavriel after Webb *et al.* 2009, p. 202)

DISTRIBUTION OF WARES IN THE BASIC SHERD COUNT AT POLITIKO-KOKKINOROTSOS



The 1133 diagnostic sherds from Politiko are stored at the Larnaca Museum storage units. They are all numbered (for example PK P967) and stored in boxes according to these numbers. They have been catalogued by Webb, who recorded Pottery Artefact Number, Ware, General Shape, Specific Shape, Extend of Preservation, and Excavation Context. In March 2022, consulting Webb's catalogue, I macroscopically studied the sherds ascribed to the wares of interest for this study. The methodology followed and tools used were the same as for the aforementioned three sites, and my study focused on the local variants of Red Lustrous Ware (RL) and Red Black Lustrous Ware (RBL), so Fabric A, Fabric B and Fabric D.

5.1.4. The Wares included in this study

For this study, three Late Chalcolithic red and/or black burnished wares from four sites across the island were selected for macroscopic analysis. Subsequently they were sampled for mineralogical, chemical, and microstructural characterisation, involving the use of optical polarising microscopy and handheld energy-dispersive X-ray fluorescence spectroscopy. These are the most ubiquitous wares in the Late Chalcolithic. They are comparable due to their monochrome red and/or black heavily burnished surfaces, their fine and hard fabrics, their occasional relief decoration, and the fact that they occur mainly in bowls and storage jars. These have been labelled Red Black Stroke-Burnished Ware (RB/B), the Red Lustrous Ware (RL) and the Red Black Lustrous Ware (RBL).

In addition, three more wares have been selected for analysis. To begin with, the Spalled Ware (SW), because it is a main Late Chalcolithic ware which occurs in three out of the four sites included in this study. It is a very hard pottery, and its main characteristics are its hardness and the white inclusions that are visible on the surface. Additionally, only from Chlorakas-*Palloures*, the Late Chalcolithic Red Monochrome Ware (LChalRM) was selected due to its high occurrence in storage jars and because, along with RB/B and SW, it is one of the main Late Chalcolithic wares of the site. However, it doesn't occur as commonly as RB/B and SW, and it is suspected that its imported from the Polis area (Charalambos Paraskeva after personal communication; Lisa Graham after personal communication). Finally, Coarse Ware (CW) has been sampled from Ambelikou-*Agios Georghios* and Politiko-*Kokkinorotsos*. CW is a red/brown coarse ware with almost no surface, which is usually found in domestic contexts and was probably produced locally. It occurs in low-fired flat-based pans or trays, that are common in all Middle Chalcolithic and Late Chalcolithic sites. Therefore, it is studied to cross-check local clays and whether these were used for any of the other wares.

By exploring the compositional and particularly the technological variability within and among these pottery types, an enhanced understanding of pottery technology and production in the Late Chalcolithic is obtained. Additionally, all these wares share some morphological and technological elements with subsequent Philia pottery types (e.g. Red Polished Philia Ware) but also with coeval pottery from Anatolia (e.g. Red Black Burnished Ware) and the Levant (e.g. Khirbet Kerak Ware). These stylistic similarities include highly burnished reduced surfaces and relief decoration, while the technological similarities include firing and forming techniques (Peltenburg, 2007; Bolger, 2007; 2013; Bolger & Peltenburg, 2014).

5.2. The Macroscopic Analysis

5.2.1. Clay Procurement and Preparation – The Macrofabrics

To begin with, to identify clay procurement and preparation, the macrofabrics have been identified. To do so, the following parameters have been recorded: the colour of the clay matrix, documented using a Munsell® CAPSURE Color Matching Tool; its texture (fine, medium, coarse); whether there is reduction and to what degree; hardness; and associated inclusions, identified with the help of a 10x magnification lens and a x400 USB microscope (Veho, Discovery VMS004). Inclusions were described according to their colour, size (small <3mm, medium 3–5mm, large >5mm), frequency in percentages according to the Wentworth Scale, and their sorting was categorized into well, fair, or poor, depending of both frequency and size. Voids have also been recorded. Visual charts for these parameters are presented in Appendix IV, while the terminology is explained in the Glossary in Appendix VII. As a result, six macrofabrics have been identified (Table 11).

Table 11: Overview of the macrofabric groups identified in this study (created by Maria Hadjigavriel)

MACRO-FABRIC GROUP NO.	WARES	SITES	HARDNESS	REDUCTION - CORE	MATRIX COLOUR	INCL. COLOUR	INCL. FREQUENCY	INCL. SORTING	INCL. SIZE
1	RB/B	▸ Chlorakas-Palloures ▸ Kissonerga-Mosphilia ▸ Ambelikou-Agios Georghios	Hard	Reduced, diffused core margins or Reduced, no core	5YR 4/2 2.5YR 5/6 2.5Y 5/2 5YR 5/6 2.5YR 5/6 5YR 6/4	Beige Brown Grey Red Blue White	20%-30%	Poor	0.5-3.0 mm
2	SW	▸ Chlorakas-Palloures ▸ Kissonerga-Mosphilia ▸ Ambelikou-Agios Georghios	Very Hard	Reduced, diffused core margins or Reduced, no core	7.5YR 4/1 2.5Y 5.1 7.5YR 3/2 7.5R 5/3 2.5YR 5/4 5Y 5/1 5YR 6/3	Grey Orange Red Blue White	20%	Poor	0.5-3.0 mm
3	LChalRM	▸ Chlorakas-Palloures	Hard	Reduced, diffused core margins	7.5YR 5/2 7.5YR 5/3 5YR 5/4 10YR 4/3	Grey, Brown Orange White	20%	Poor	0.5-2.0 mm
4	RBL RL	▸ Politiko-Kokkinorotsos	Hard	Reduced, diffused core margins or Reduced, no core	7.5YR 5/3 7.5YR 5/4 2.5YR 5/6 7.5YR 5/2 5YR 5/4 2.5YR 4/4 7.5YR 5/3	Beige Brown Grey Red Orange White	10%-20%	Poor	0.5-1.0 mm
5	RBL RL	▸ Ambelikou-Agios Georghios	Hard	Reduced, diffused core margins or Reduced, no core	2.5YR 4/4 5YR 5/4 2.5YR 5/4 2.5YR 4/4 10R 5/6 2.5Y 5/2	Beige Brown Grey Orange Grey White	20%-30%	Poor	0.5-1.0 mm
6	CW	▸ Chlorakas-Palloures ▸ Kissonerga-Mosphilia ▸ Ambelikou-Agios Georghios ▸ Politiko-Kokkinorotsos	Very Soft	Oxidised, no core	7.5YR 5/2 7.5YR 5/3 5YR 5/4 10YR 4/3	Grey Brown Orange White	20%	Poor	0.5-2.0 mm

Macrofabric Group 1: Red/pink/orange clays with prominent red, blue and white inclusions

Sherds belonging to Macrofabric Group 1 are easily recognizable due to their bright pink to orange matrix colours, and the prominent blue inclusions (Figure 39). It is characterized by blue, grey and red inclusions, with the clay being the same bright orange/red colour as the surface. Sections are usually uniform but often with a central (sometimes somewhat irregular) or inner core (very rarely outer) with diffused or more often sharp core margins (see Appendices II and III). This indicates either a reduction phase during firing or the intentional prevention of oxidation of iron in the clay. Alternatively it could result from the duration of the oxidising phase in combination with the presence of organics that might have burned out (Orton & Hughes, 2013, pp. 152-154; Figure 13.1: 8, 10). All fragments were characterised as hard; and can barely be scratched by a fingernail, which in Mohs' hardness scale is placed between gypsum (2) and calcite (3) (Rice, 1987, p. 356, table 12.1; Orton & Hughes, 2003, p. 233). This group corresponds exclusively to the Red Black Stoke-Burnished Ware (RB/B), and has been found primarily in *Chlorakas-Palloures*, *Kissonerga-Mosphilia* with a few of these sherds in *Ambelikou-Agios Georghios*.

Figure 39: Macrofabric Group 1 sherd from *Chlorakas-Palloures* (photographs by Maria Hadjigavriel)



Macrofabric Group 2: Pink-buff clays with prominent large white inclusions along with red, blue and grey inclusions

Sherds belonging to Macrofabric Group 2 have pink-buff colours. It contains the blue, grey and red inclusions present at Macrofabric Group 1 sherds, but it is dominated by often larger white inclusions (Figure 40). Sections are usually with an inner core with diffused margins, demonstrating either a reduction phase during firing or intentional prevention of oxidation of iron in the clay (Orton & Hughes, 2003, pp. 152-154; Figure 13.1: 8, 10). All fragments were documented as very hard, between calcite (3) and fluorite (4) (Rice, 1987, p. 356, table 12.1; Orton & Hughes, 2003, p. 233). This group corresponds exclusively to the Spalled Ware (SW) and it has been retrieved mainly in *Chlorakas-Palloures* and *Kissonerga-Mosphilia*, while a few sherds of this ware are known from *Ambelikou-Agios Georghios*.

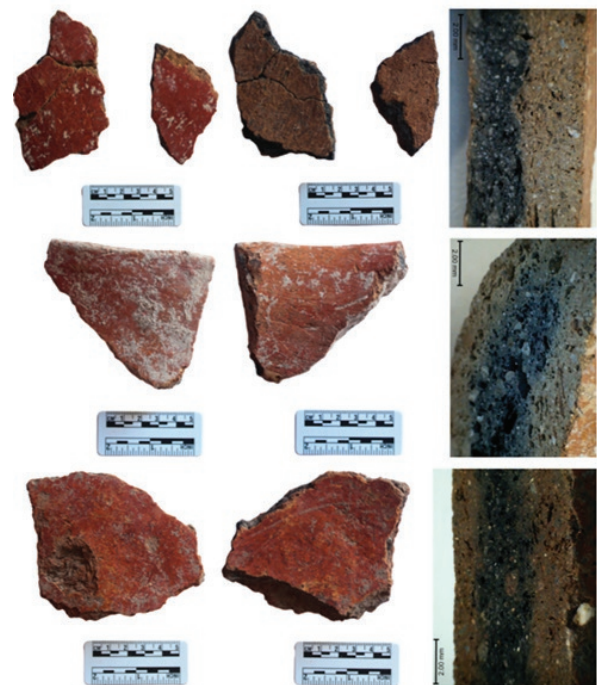
Macrofabric Group 3: Dark brown clays with prominent black core and white inclusions

The Macrofabric Group 3 has dark brown clay colours and is characterized by a dark inner core, white inclusions and long voids that indicate the presence of organic matter. Inclusions include a high concentration of organic filler, specifically medium to large organics (straw or other organic materials), voids, sparse concentrations of white inclusions, and angular grey igneous filler (Figure 41). All fragments were documented as hard according to Mohs' hardness scale – (2) to (3) (Rice, 1987, p. 356, table 12.1; Orton & Hughes, 2003, p. 233). It has been found at Chlorakas-Palloures, and corresponds exclusively to the LChalRM ware.

Figure 40: Macrofabric Group 2 sherds from Chlorakas-Palloures and Kissonerga-Mosphilia (photographs)



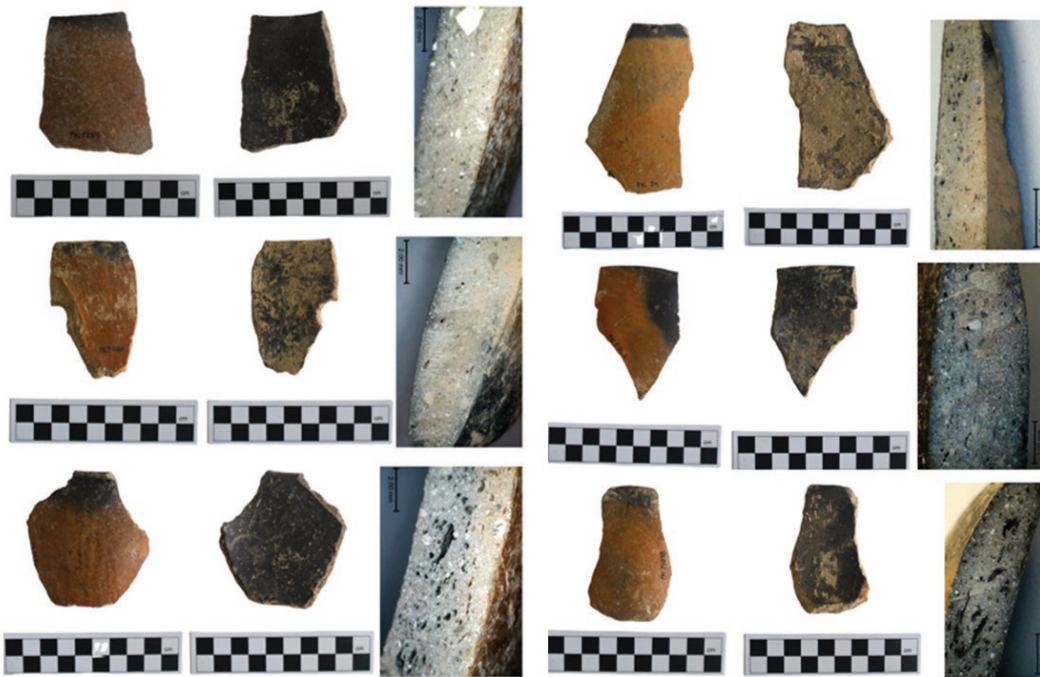
Figure 41: Macrofabric Group 3 sherds from Chlorakas-Palloures (photographs by Maria Hadjigavriel)



Macrofabric Group 4: Red/brown clays with prominent beige and brown inclusions

The sherds belonging to Macrofabric Group 4 have yellowish-red or brown clays, they are always reduced, and occasionally with a core with diffused core margins (Orton & Hughes, 2003, pp. 152-154; Figure 13.1: 8, 10; Figure 42). Inclusions can be beige, brown, grey, red, orange or white. All fragments were characterised as hard according to Mohs' hardness scale – (2) to (3) (Rice, 1987, p. 356, table 12.1; Orton & Hughes, 2003, p. 233). According to Webb, the fired sections are predominantly yellowish-red (5YR4/6, 5YR5/6) and brown (7.5YR5/4) (Webb *et al.*, 2009a, p. 198; Figure 19). Within this Macrofabric Group there is a variety which is very hard and well levigated with many small white and grey inclusions and small organics. It has been retrieved exclusively at Politiko-Kokkinorotsos and corresponds to the Red Lustrous Ware (RL) and the Red Black Lustrous Ware (RBL), or local Fabric A, Fabric B and Fabric D.

Figure 42: Macrofabric Group 4 sherds from Politiko-Kokkinorotsos (photographs by Maria Hadjigavriel)



Macrofabric Group 5: Orange/brown clays with small white and grey inclusions

Macrofabric Group 5 is characterized by the clay is light brown to red, with fine small inclusion of various colours, and tiny organic inclusions (Figure 43). White, grey, and red inclusions are occasionally present. Sections are usually with a central (sometimes somewhat irregular) with diffused or more often sharp margins, indicating either a reduction phase during firing (Orton & Hughes, 2003, pp. 152-154; Figure 13.1: 8, 10). In rare occasions, the sections are oxidised without a core. All fragments were characterised as hard according to Mohs' hardness scale – (2) to (3) (Rice, 1987, p. 356, table 12.1; Orton *et al.* 2003, p. 233). This group has been found exclusively in Ambelikou-Agios Georghios, and corresponds to the Red Lustrous Ware (RL) and the Red Black Lustrous Ware (RBL).

Figure 43: Macrofabric Group 5 sherds from Ambelikou-Agios Georgios (photographs by Maria Hadjigavriel)

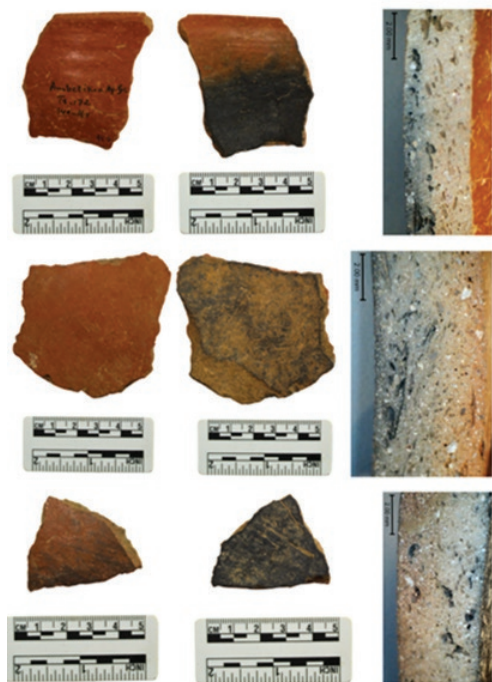


Figure 44: Macrofabric Group 6 sherds from Politiko-Kokkinorotsos (photographs by Maria Hadjigavriel)



Macrofabric Group 6: Brown clays with coarse large inclusions

Macrofabric Group 6 is the coarsest of the assemblage. The colour of the clay is light to dark brown, and is characterized by large inclusions. It has no core, and inclusions can be grey, brown, orange or white. Often, organic matter is visible (Figure 44). All fragments were documented as soft – Mohs scale (1) to (2) (Rice, 1987, p. 356, table 12.1; Orton *et al.* 2003, p. 233). It is the only Macrofabric Group that is present at all four sites and it corresponds exclusively to the Coarse Ware (CW).

5.2.2. Vessel Forming Techniques

Pottery in Late Chalcolithic Cyprus is exclusively handmade and most likely produced at household level, even though arguments for increased standardization of pottery production have been put forth (e.g. Wallace, 1995). Due to the nature of the datasets, which is comprised mostly of small sherds, a detailed reconstruction of vessel forming techniques at the four sites is not possible. However, the macroscopic analysis has confirmed that all wares are handmade and have been made with one (or a combination of) the following techniques: pinching; coiling; and slab-building. Usually, small vessels like bowls were made with the pinching technique, while larger vessels such as storage jars were made with coiling or slab-building.

5.2.2.1. Pinching

The pinching technique is one of the most common methods to form a vessel directly from a lump of clay. First, the potter forms a ball of clay, holds it in their palm and press downwards with their thumb in the centre of the ball, while gradually pinching out the walls of the vessel, reaching the desired shape and wall thickness (Rye, 1981, p. 70). When examining vessels macroscopically, thumb marks on the inside of the vessel can be indicators of the pinching technique. This technique is preferred for smaller vessels such as bowls (Bolger & Shiels, 2003, p. 136).

5.2.2.2. Coiling

Coiling serves as a fundamental method for shaping pottery, wherein it is employed to establish the basic form of a vessel before further refinement through additional techniques. This process entails rolling out clay into elongated, sausage-like coils, which are then wound around like springs. Constructing a vessel using coils involves placing them around the circumference, applying pressure to merge them and incrementally raising the height. The potter would often apply some water between adding a new coil to ensure that merging will be successful (Souzana Petri, personal communication). When examining a coil-built vessels, coils can be visible due to variation in wall thickness and regular “corrugations” if the junctions were not smoothed (Rye, 1981, p. 62). Macroscopically, these coils can be visible, also in breaks that occur along their edges. This technique is preferred for bigger vessels such as storage jars (Bolger & Shiels, 2003, p. 136). Often, the potter would make the base of the vessel using the pinching technique, and then add coils to make the walls.

5.2.2.3. Slab-building

Slab-built vessels are made from flat sheets of clay merged together. The potter makes long flat slabs of clay by pushing it on a flat surface and flattening it with tools or just by hand. Then the desirable shapes are cut, for example a circle for the base and a rectangular for the walls, and then one merges them together like in the coiling technique. Similarly to the coiling technique, breaks in sherds often occur at the junctions of the slabs. This technique is difficult to recognize archaeologically, but it should be considered for large vessels (Souzana Petri, personal communication; Rye, 1981, p. 71).

5.2.3. Surface Treatment and Decoration

Surface treatment and decoration are visible attributes of a vessel and have been central for the construction of typologies but also in studies concerned with emulation of style. The assemblage studied for this project can be divided into the following broad categories of surface treatment: self-slipped, self-slipped and burnished, slipped and burnished, and with the addition of relief decoration. Mottling and reduced blackened surfaces are also a characteristic of the red and black surfaces, occurring during firing.

Slip is created by mixing water with clay until it reaches a liquid consistency, typically in a color that contrasts with the final vessel it's meant for. However, when the clay used to make the slip is the same as the clay used to produce the vessel, then the vessel is self-slipped, produced by wiping the vessel with a wet cloth (Orton & Hughes, 2013, p. 86). Burnishing can be defined as “*the effect of polishing the leather-hard surface of a pot was to align the clay mineral platelets parallel with the surface of the pot, giving it a sheen*” (Orton & Hughes, 2013, p. 90). Mottling is when irregular patches of distinct black color occur during firing, accidentally or intentionally. Lastly, reduced blackened surfaces are surfaces that are uniform black and were probably created intentionally during the firing process.

5.2.3.1. Surface Treatment and Decoration of the Red Black Stroke-Burnished Ware (RB/B)

This ware has a distinct surface treatment and it can be recognised by its red to pink clay and surface colours (10R 5/6, 10R 6/6, 2.5YR 6/6, 5YR 4/2, 7.5YR 5/3) and the highly burnished and shiny surfaces, often with visible burnishing strokes (Figure 45). In both *Chlorakas-Palloures* and *Kissonerga-Mosphilia*, the surface is occasionally covered with a thin white-wash (ca. 3%). Due to its rarity, this variation is not included in this study. Sporadically, relief decoration in the form of knobs and lines occurs. Specifically, in *Kissonerga-Mosphilia*, three vessels and 43 sherds have relief decoration (Bolger *et al.*, 1998, p. 120). In *Chlorakas-Palloures*, about 15 sherds with relief decoration were recorded by the summer of 2021, when the macroscopic study and the sampling took place.

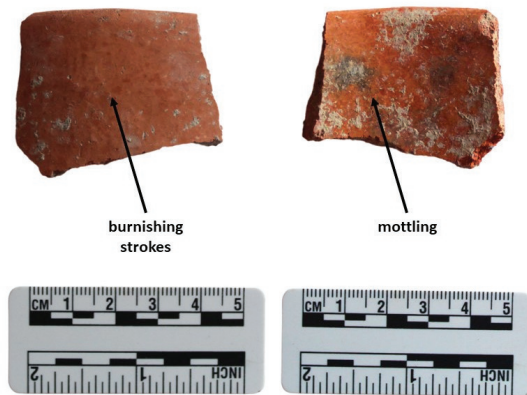


Figure 45: Surface treatments of RB/B sherds from *Chlorakas-Palloures* (photographs by Maria Hadjigavriel)

5.2.3.2. Surface Treatment and Decoration of the Spalled Ware (SW)

SW surfaces are often pock marked (spalled) and covered with a thinly applied dull red to grey-black and/or beige slip (7.5YR 5/2, 5YR 5/3, 2.5YR 5/4, 5YR 4/3). Only one SW sherd with relief decoration has been found in *Kissonerga-Mosphilia* and none in *Chlorakas-Palloures*, suggesting that this might be a more utilitarian ware than the RB/B (Bolger *et al.*, 1998, p. 121). In both sites, very rarely, the surface is covered with a thin white-wash in exceptional cases, a variation which has not been sampled. Often it is polished or burnished, with visible burnishing strokes like the RB/B (Figure 46).

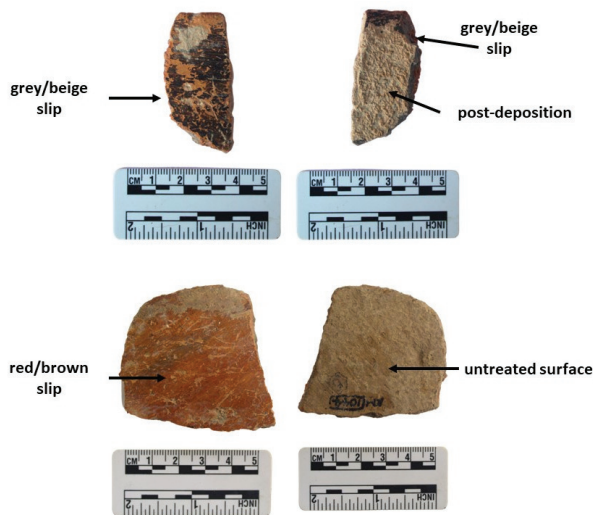


Figure 46: Surface treatments of SW sherds from *Chlorakas-Palloures* and *Kissonerga-Mosphilia* (photographs by Maria Hadjigavriel)

5.2.3.3. Surface Treatment and Decoration of the Late Chalcolithic Red Monochrome Ware (LChalRM)

Variations of this ware in the Chlorakas-*Palloures* assemblage concern mainly these surface treatments: red, orange, with blackened surfaces, plain white, Red-on-White with orange diagonally crossing parallel strokes. For the purposes of this study only the main variation is included, namely the one with a red surface (2.5YR 4/4, 5YR 5/4, 7.5YR 5/3). The interior is occasionally covered with a beige slip (7.5YR 4/3), otherwise it is left untreated (Figure 47).

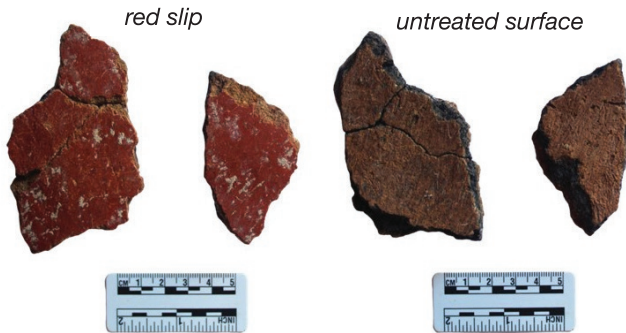


Figure 47: Surface treatments of LChalRM sherds from Chlorakas-Palloures (photographs by Maria Hadjigavriel)

5.2.3.4. Surface Treatment and Decoration of the Red Lustrous Ware (RL) and the Red Black Lustrous Ware (RBL)

RL sherds are red to orange in surface colours (10 R 4/4-5/6), and are medium to highly burnished. RBL sherds have surfaces that are blackened, usually uniformly on the interior side and irregularly on the exterior side (Dikaïos, 1962, p. 143). Occasionally, RL sherds have randomly blackened spots on their surfaces (Figure 48). Therefore, the distinction between the two wares is based on the uniformity and regularity of the blackened surfaces, and not their complete absence.

In Politiko-*Kokkinorotsos*, the RBL has bichrome surface treatment with lustrous black interior and red-brown exterior, often with an irregular black band at the rim of the exterior side (Figure 49). It is worth noting that eleven of these sherds have relief decoration. A few sherds have patterned burnishing or both relief decoration and patterned burnishing. According to Webb (*et al.*, 2009a, pp. 203-204), this variety can be considered as similar to the RBL from Ambelikou-*Agios Georghios*. RL at Politiko-*Kokkinorotsos* is described as Fabric B. It comprises the 25,5% of the assemblage. Surfaces are matt or lustrous red-brown on both the interior and exterior sides. Relief decoration also occurs (Figure 50). According to Webb (*et al.*, 2009a, pp. 203-204), this variety can be considered similar to the RL from Ambelikou-*Agios Georghios*.

Figure 48: Surface treatments of RL (right) and RBL (left) sherds from Ambelikou-Agios Georghios (photographs by Maria Hadjigavriel)



Figure 49: : Surface treatments of Fabrics A and D (RBL) sherds from Politiko-Kokkinorotsos (photographs by Maria Hadjigavriel)

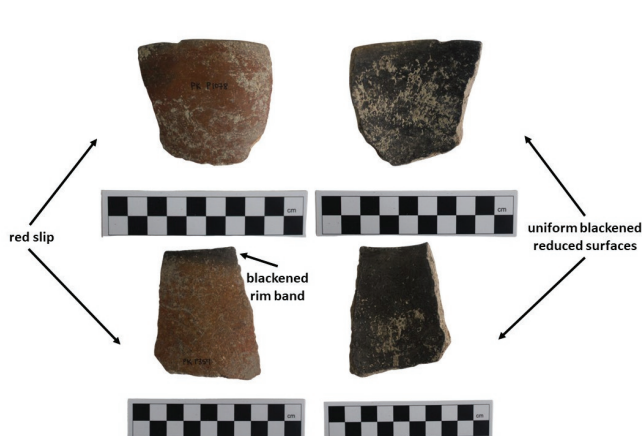
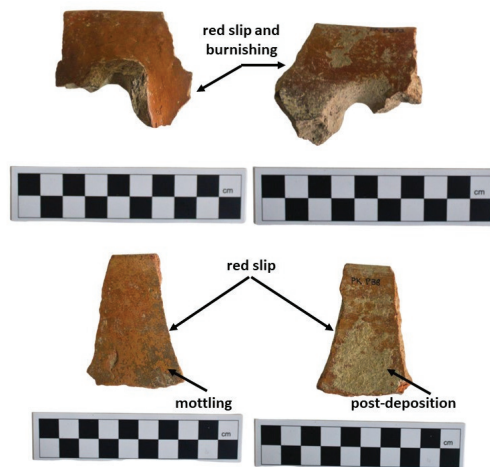


Figure 50: Surface treatments of Fabric B (RL) sherds from Politiko-Kokkinorotsos (photographs by Maria Hadjigavriel)



5.2.3.5. Surface Treatment and Decoration of the Coarse Ware (CW)

Coarse Ware (CW) from all sites has untreated surfaces, with often visible impressions of organic materials, maybe resulting from pressing the clay on baskets or other similar use surfaces (Figure 51).



Figure 51: Surface treatments of Coarse Ware (CW) sherds from Politiko-Kokkinorotsos (photographs by Maria Hadjigavriel)

5.2.4. Vessel Shapes

As already mentioned, the repertoire of Late Chalcolithic pottery is comprised mostly of several kinds of bowls and jars. Bowls were made with the pinching or the coil-building techniques, while larger jars were produced with the slab-building or the coil-building techniques (Bolger & Shiels, 2003, p. 136). Bases are mostly flat or concave, and several types of handles and lugs occur, modelled separately and then attached to the vessels. An overview of the vessel shapes occurring for each ware is presented in Table 12 below, while the most common types of bases and handles/lugs are presented in Figures 52 and 53.

5.2.4.1. Vessel Shapes of the Red Black Stroke-Burnished Ware (RB/B)

This production includes several types of bowls, jars, and spouted vessels, with relatively standardized morphologies: bowls can be categorized as hemibowls, deep, spouted, ovoid and conical. Jars can be categorized as holemouth jars and storage jars, occasionally with spouts. Platters and flasks also occur. For bowls, wall thickness varies from 0,4 to 0,9 cm and diameters from 6 to 17 cm, while for jars, wall thickness is somewhere between 0,5 to 1,5 cm and diameter from 5 to 15 cm.

5.2.4.2. Vessel Shapes of the Spalled Ware (SW)

The Spalled Ware occurs mainly in closed shapes such as holemouth and storage jars, flasks, and more rarely hemibowls and platters. Wall thickness varies from 0,5 to 1 cm and diameter from 6 to 11 cm. In *Kissonerga-Mosphilia*, closed forms outnumber open ones by 4:1, and in *Chlorakas-Palloures* a similar pattern is observed (Bolger *et al.*, 1998, p. 121; personal observations). All shapes are manufactured primarily with the coil-building technique.

5.2.4.3. Vessel Shapes of the Late Chalcolithic Red Monochrome Ware (LChalRM)

In *Chlorakas-Palloures*, the Late Chalcolithic Red Monochrome Ware occurs almost exclusively in large holemouth and storage jars, made with the coil-building or the slab-building technique. Less commonly, hemibowls and conical bowls also occur. There is one unique holemouth jar with three vertical handles. Wall thickness varies from 0,8 to 1,5 cm, and the diameter varies from 9 to 15 cm.

5.2.4.4. Vessel Shapes of the Red Lustrous Ware (RL) and Red Black Lustrous Ware (RBL)

In *Ambelikou-Agios Georghios*, both wares occur in bowls, storage jars and spouted vessels, namely deep and shallow bowls, platters, buckets, holemouth jars, storage jars and spouted jugs. Wall thickness varies from 0,3 to 0,8 cm, and the diameter from 6 to 15 cm. In *Politiko-Kokkinorotsos*, the Fabric A (RBL) occurs mainly in deep spouted holemouth jars and small and medium-sized bowls. Some horn-shaped and cylindrical handles are associated with bowls and jars. Fabric D (RBL) occurs almost exclusively in closed vessels like holemouths with vertical loop and horn-shaped handles. Lastly, Fabric B (RL) occurs primarily in large storage jars with vertical loop, tab, or ledge handles. Less often, it also occurs in small bowls, holemouth jars, tubular-spouted vessels, horn-shaped handles. Wall thickness varies from 0,5 to 1 cm and rim diameter from 6 to 26 cm.

5.2.4.5. Vessel Shapes of the Coarse Ware (CW)

The Coarse Ware (CW) occurs only in low-walled flat-based trays or pans with no surface treatment and in rough flanged straw-impressed bases and body sherds, made with the slab-building technique (Webb *et al.*, 2009a, p. 200). Wall thickness varies from 1,1 to 2,5 cm.

Table 12: Table indicating the most popular vessel shapes per ware (created by Maria Hadjigavriel, with drawings by Ermina Emmanouel)

THE MOST COMMON VESSEL SHAPES PER WARE						
	Red Black Stroked-Burnished Ware (RB/B)	Spalled Ware (SW)	Late Chalcolithic Red Monochrome Ware (LChRM)	Red Lustrous Ware (RL)	Red Black Lustrous Ware (RBL)	Coarse Ware (CW)
Hemibowl 	x	x	x	x	x	
Deep bowl 	x	x		x	x	
Ovoid bowl 	x			x	x	
Conical bowl 	x		x	x	x	
Spouted bowl 	x			x	x	
Holemouth jar 	x	x	x	x	x	
Storage jar 	x	x	x	x	x	
Spouted jar 	x	x	x	x	x	
Collared storage jar 		x	x	x	x	
Flask 	x	x		x	x	
Platter/tray 	x	x		x	x	x

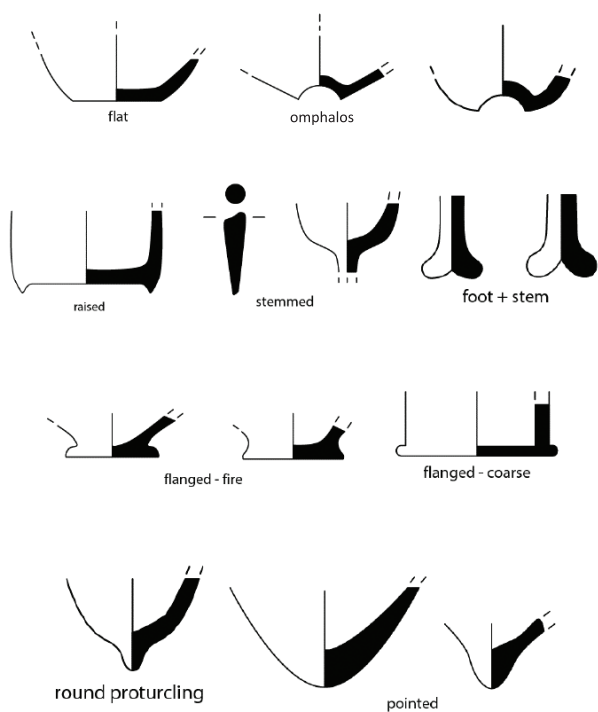


Figure 52: The most common base types in Late Chalcolithic Cyprus (created by Maria Hadjigavriel and Ermina Emmanouel)

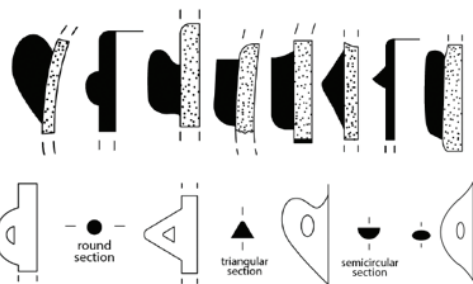
SIMPLE



HORN TYPE



EAR TYPE



LUGGED

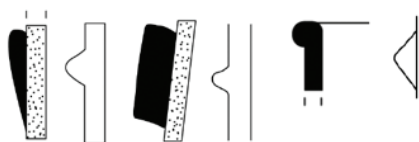


Figure 53: The most common handles and lugs types in Late Chalcolithic Cyprus (created by Maria Hadjigavriel and Ermina Emmanouel)

5.2.5. Firing

For the firing of Chalcolithic pottery, it has been suggested that open firing, pit firing, and bon-firing (so open fires in a pit or the ground surface) seem the more probable techniques, rather than kilns. It seems that Late Chalcolithic potters have learned how to reach higher temperatures and control firing better in comparison to the Middle Chalcolithic, when vessels are not that hard. Specifically, Middle Chalcolithic RW sherds range between soft and medium in hardness because they were possibly fired at open-firings of rather low temperatures. On the other hand, Late Chalcolithic pottery would be fired in steadily increasing temperatures reaching up to 600-800 °C (Charalambos Paraskeva after personal communication). Even though these temperatures do not seem that high, they are considered high for these types of firing techniques and succeeding a steady rise requires knowledge and expertise, and could indicate firing in insulated bonfires. Moreover, firing was used for aesthetic purposes in some of the wares analysed for this study. On RB/B vessels from all sites, blackened surfaces occur, which could be either accidental, by misfire, fire-flashing, incorrect position of the pots during firing, or imperfect control of oxygen flow and rapid increase of temperatures at the beginning of the firing process; or intentional by the intentional reversion of the atmosphere from oxidizing to reducing during fire (Stewart, 1985, p. 267; Bolger *et al.*, 1998, p. 145; Hadjigavriel, 2021, p. 88). During pottery processing at Chlorakas-Palloures we initially recorded the blackened surfaces. However, over the years we concluded that this is a characteristic of almost all of our RB/B sherds and an integral characteristic of the surface treatment of this ware.

The differences in firing are illustrated during macroscopic analysis. It is observed that RB/B and SW sherds often have a central core (sometimes somewhat irregular) or an inner core (very rarely outer) with diffused or more often sharp core margins. This indicates either a reduction phase during firing or intentional prevention of oxidation of iron in the clay, or it results from the duration of the oxidising phase in combination with the presence of organics that might have burned out. In general, LChalRM sherds are not as hard as RB/B and SW, but they all have a dark central or inner core.

In Ambelikou-Agios Georghios and Politiko-Kokkinorotsos, all RBL sherds have black lustrous interior surfaces and occasionally black exterior rims or blackened exterior surfaces, a result achieved deliberately by the “targeting” or the “black-top” techniques. Accidental blackening of surfaces can be distinguished by blackening done deliberately by the sooty deposit the first leaves behind on the surface (Stewart, 1985, p. 270). Most sherds have a central core with diffused or sharp core margins, evident in the macroscopic analysis and in thin section. The same applies to RL sherds from both sites. In general, it seems that potters in the north and central region of the island could control firing processes better, producing uniform black surfaces, in contrast to the potters in the Paphos region, where blackened surfaces are irregular (Figure 54). Whether this irregularity is intentional or not is difficult to determine. Lastly, all CW studies from all four sites are very soft, crumbly even, and not reduced at all, indicating that they were fired at very low temperatures. This is in accordance to the suggestion that pots of this ware were used as trays for food preparation and other activities rather than vessels that would be used for cooking.



Figure 54: RB/B sherd with irregular black exterior surface from Chlorakas-Palloures (a) and RBL with black uniform interior surface and exterior rim band from Politiko-Kokkinorotsos (b) (photographs by Maria Hadjigavriel)

5.3. Concluding Summary

To conclude, this chapter provided an overview of the wares included in this study and the results of the macroscopic analysis. It has demonstrated that pottery production at Chlorakas-*Palloures* and Kissonerga-*Mosphilia* is extremely similar, with the Red Black Stroke-Burnished Ware and the Spalled Ware being undistinguishable between the two sites: they both belong to Macrofabric Groups 1 and 2 respectively, and have the same surface treatment and decoration, vessel forming techniques, vessel shapes and firing techniques. The Late Chalcolithic Red Monochrome Ware is represented by Macrofabric Group 3, and constitutes a different pottery production tradition than the other two aforementioned wares from Chlorakas-*Palloures*. On the other hand, in both Politiko-*Kokkinorotsos* and Ambelikou-*Agios Georghios*, we do not see a direct link between ware and macrofabric group: both Red Lustrous Ware and Red Black Lustrous Ware from Politiko-*Kokkinorotsos* belong to Macrofabric Group 4, and both of these wares from Ambelikou-*Agios Georghios* belong to Macrofabric Group 5. However, these wares from both sites have the same surface treatments and decorations, vessel forming techniques, vessel shapes and firing techniques. Lastly, the Coarse Ware variant from Politiko-*Kokkinorotsos* and Ambelikou-*Agios Georghios* have the same surface treatment and decoration, vessel forming techniques, vessel shapes and firing techniques. These results are outlined in the Table 13 below.

In order to further examine the assemblages and test the observations and conclusions made during the macroscopic analysis, 81 sherds have been sampled for further archaeometric analyses, in the form of ceramic thin section petrography and hhXRF. The sampling strategy and results of these analyses are presented in the following chapter.

Table 13: Overview of the results of the macroscopic analysis (created by Maria Hadjigavriel)

	Red Black Stroked-Burnished Ware (RB/B)	Late Chalcolithic Red Monochrome Ware (LChARM)	Red Lustrous Ware (RL)	Red Black Lustrous Ware (RBL)	Spalled Ware (SW)	Coarse Ware (CW)
SITE & MACROFABRIC GROUP NO.						
Chlorakas-Palloures	1	3			2	
Kissonerga- Mosphilia	1				2	
Politiko- Kokkinorotsos			4	4		6
Ambelikou- Agios Georghios	1		5	5	2	6
SURFACE TREATMENT						
Red - highly burnished/lustre	x	x	x			
Red - highly burnished/lustre with irregular blackened surfaces	x	x	x			
Red - highly burnished/lustre and regularly blackened surfaces				x		
Grey - brown slip					x	
Relief decoration	x		x	x		
Untreated						x
FABRIC						
Soft						x
Hard	x	x	x	x		
Very Hard					x	
POPULAR SHAPES						
Bowls > jars	x			x		
Jars < bowls		x	x		x	
Trays						x