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Mobile peoples - permanent places : the construction and use of stone-built architecture by nomadic communities in the Jebel Qurma region of the Black Desert (Jordan) between the Hellenistic and Early Islamic periods.

Huigens, H.O.

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Author: Huigens, H.O.
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3 Surface Surveys in the Jebel Qurma Region: Methods and Results

3.1. INTRODUCTION

Having presented the natural environment of the Jebel Qurma region in the previous chapter, this chapter aims to present its archaeological remains as documented through surface surveys that were carried out through remote sensing and pedestrian survey methods since 2012. The *Jebel Qurma Archaeological Landscape Project* is not confined in scope to the remains of Classical and Late Antiquity, but is a multi-period project and thus focuses on all periods of inhabitation. The occupational history of the region has proved to be very extensive, as remains from the Palaeolithic period up to recent times are represented (Akkermans & Huigens in press). This chapter presents, firstly, the methods that have been employed to document the surface remains of the region. Secondly, the results of the surface surveys are presented, including the types of archaeological and epigraphic remains that have been documented, and the criteria used to date these. More detailed information retrieved through excavations is not included in this chapter, but presented in Chapters 4 and 5.

In general, an intensive prospection methodology was used to investigate in detail the full diversity of the archaeological landscapes of the study area. As was outlined in Chapter 1, no intensive landscape study has been carried out before in the Black Desert, and to a large degree field methods had to be developed from scratch, although to some degree building on experiences from comparable regions elsewhere. Predictions on the nature of archaeological remains could be made to some extent based on publications of previous research in the Black Desert (e.g. Betts et al. 2013; Kennedy 2011). These studies had already shown the existence of several feature types, including desert kites, cairns, enclosures, wheels, as well as, obviously, inscriptions and rock art. At the same time, however, since an intensive survey strategy had not been adopted before, new and unexpected features were encountered each survey season, which in part led to the alteration of field strategies. Admittedly, to some degree, this has led to inconsistencies in the dataset. This is of course only natural in field projects that start out basically from scratch, and making any inconsistencies in the dataset explicit is warranted.

This study incorporates the result of fieldwork carried out between 2012 and 2016. Although in more recent years fieldwork has been carried out as well, the results from these campaigns were not used in this study due to time constraints. The work that was carried out during the field campaigns was not done solely by the author. A large team of staff and students worked on documenting these remains.

3.2. PEDESTRIAN SURVEYS: OBJECTIVES AND METHODS

3.2.1. Survey objectives

An intensive pedestrian survey methodology has been used to study of the Jebel Qurma region, which aimed to document the full diversity of both archaeological and epigraphic remains in a systematic and comprehensive way. Survey studies carried out in the Black Desert commonly rely heavily – if not entirely – on aerial photographs and satellite imagery (see Chapter 1), but although such imagery provides a useful additional source of information, many – if not most – of the surface remains, such as small stone structures, inscriptions and rock art, and artefacts, are too small to be visible from above (Huigens 2013). Therefore, the surface survey carried out in the Jebel Qurma region mostly relies on data acquired through pedestrian surveys, while remote sensing data provides an additional source of information. This was the case, for example, when observed features are so extensive that a view from

above helps determining the spatial extent and configuration of features. Desert kites are a good example in which the study of satellite imagery may aid establishing the configuration of such features.

The pedestrian survey may be defined as the study of archaeological surface remains on the ground which usually includes field walking, i.e. the systematic prospection of a given area, collecting artefacts from the surface, and cleaning archaeological features. Excavations are usually not part of surveying but entails a different archaeological method that focusses on a particular site rather than a broader landscape. The systematic pedestrian survey has been a major tool to study archaeological landscapes of the Near East from the 1960s onwards (Wilkinson 2000, 220-2; 2003, 37-9). Although surveys have sometimes been used mainly to locate sites suitable for excavation, survey methods can in themselves be used to answer particular research questions. Archaeological surveys may be used to acquire detailed datasets of archaeological landscapes, in terms of the nature of archaeological remains and variability therein and the history of inhabitation in a given area.

It is also, however, a rather labour intensive method, as it requires the archaeologists to be actually in the field, usually with a team of colleagues, with numerous logistical and financial consequences. Sampling strategy is therefore often an important issue in pedestrian survey projects. Particular choices always need to be made in such projects in terms of sampling, which can relate to the geographic extent of the survey area, to the degree of coverage within that area – also referred to as the survey intensity – and to the exclusion of particular datasets, such as materials from a particular period.

Another important issue, both methodologically and interpretatively, in pedestrian surveys is the way in which archaeological remains are classified and documented. Particularly problematic in this respect is the way in which archaeological sites are defined. The archaeological site is a concept that particularly evolved from traditional settlement-based archaeology, in which the term is used to indicate a well-defined cluster of archaeological remains (Binford 1964, 431). Traditional site categories include, for example, villages, sanctuaries, cemeteries, forts, etc. One of the aims of a landscape approach is to contextualise such sites in broader geographic contexts (see Chapter 1), which immediately creates problems in terms of site definition. For example, it becomes difficult to say where a village ends and where its hinterland begins. Also, archaeological landscapes may comprise many archaeological features that are wholly different from traditional site categories. These remains include small artefact clusters or even individual, isolated artefacts, but also extensive features such as roads or walls, field systems, and so on. Even though all of these features can essentially be called sites, the enormous variability that may occur between them, i.e. ranging from a single artefact to an entire city, means that in survey archaeology the term quickly runs the risk of losing its traditional qualitative character. Several alternatives have been proposed to classify archaeological survey data, including making a distinction between site- and off-site remains (Bintliff 1999), as well as omitting the site concept altogether (Caraher et al. 2006; Dunnell 1992). The way in which sites were defined for the Jebel Qurma survey is discussed below.

3.2.2. Survey methods

Although the pedestrian survey is a widely used and accepted archaeological field method, the way in which surveys are carried out is highly variable because of differences in the nature of archaeological landscapes and the particular research questions asked. Therefore a detailed discussion of the survey methods applied in the Jebel Qurma project is warranted.

Sampling strategy

From 2012 to 2016 five field campaigns have been carried out in the Jebel Qurma region by the *Jebel Qurma Archaeological Landscape Project*. All of these field campaigns included a period of field survey-

ing. These periods varied in length between two to ten eight weeks, and were carried out with a team of varying composition, comprising professional archaeologists and students.

The areas that were surveyed comprised a wide variety of landscapes of the Jebel Qurma region, including two of its major geomorphological units: the *harra* landscapes of the Qurma plateau and the *hamad* landscapes of the Hazimah plains to the south (Fig. 3.1). On the Qurma plateau the survey aimed to cover different topographic areas such as, on the south and west side, its ridges and slopes and the low lying areas at the foot of these slopes, but also the valley systems running into the plateau and the upland areas on top of the plateau. Areas around mudflats, including an area on the banks of the large Qa'a al-Teyarat, were surveyed as well. A similar strategy was employed in the Hazimah plains, where various different topographic zones were surveyed, as well as areas with different surface covers, such as plateaus and hillocks consisting of lime- and sandstone, low lying areas covered by desert pavements, and alluvial sediments.

Figure 3.1: Area surveyed between 2012 and 2016 in white, with the survey transects in the Hazimah plains indicated in blue. Base image: Landsat 7.

The Fuluq hills west of Wadi Rajil were not included in the sample. Nevertheless, a number of similar chert-covered hills situated closer to the Qurma plateau were surveyed, and may eventually be used to make inferences about the archaeology in this type of landscape. The entire eastern half of the study area was thus far not surveyed either. At this point, only information from remote sensing studies is available, although, in the same way as the Fuluq hills, it may be possible later to make inferences about this region based on the survey results of other *harra* landscapes. An area currently used for agriculture, the small oasis of Ghamr, was also not surveyed.

Field walking methods

Following one of the main aims of the Jebel Qurma project, namely to study the full diversity of the archaeological and epigraphic remains of its study area, an intensive survey strategy was adopted. An important distinction, in term of field walking methods, was made between the *harra* and *hamad* landscapes of the study area, largely as a result of pragmatic choices. These differences merit a separate discussion of survey strategies in the *harra* and *hamad* landscapes.

The largely flat, open terrains of the *hamad* landscapes allowed for a highly systematic transect survey strategy. Four survey transects of 120 m wide, between 1.3 and 6.3 km long, and spaced between 700 and 850 m were set out and studied through intensive field walking. All transects were subdivided into parcels of 30 m wide and 100 m long, and three field walkers were spaced 10 m apart within these parcels (Fig. 3.2). They were instructed to walk in a straight line to the far end of the parcel (i.e., over a length of 100 m) and to collect artefacts and locate potential archaeological features, which were later documented in more detail. In addition to this intensive transect method a more extensive survey was also carried out in the areas surrounding the transects. This was done to gain a better insight into site location and variability, although it was only possible through this extensive survey method to locate the bigger, more visible sites (Huigens 2015).

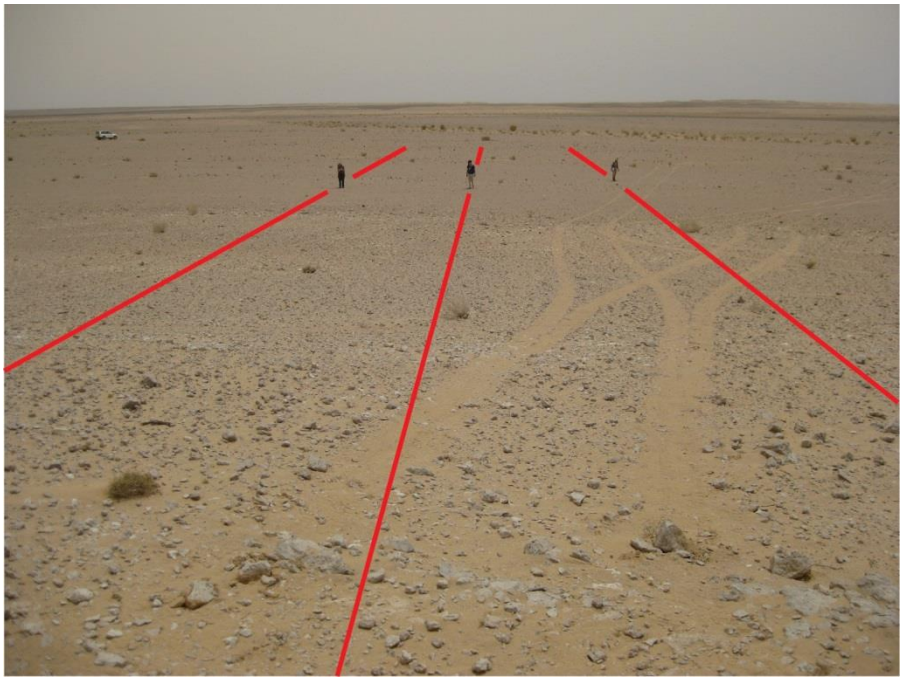


Figure 3.2: Systematic transect surveying in the Hazimah plains. Photo by author.

Figure 3.3: Team members documenting features in a *harra* landscape. Photo by P. Akkermans.

In the more rugged and undulating *harra* landscapes an equally intensive yet less rigid strategy was adopted, in which field walkers were allowed to search for artefacts and features in a free-roaming fashion (Fig. 3.3). Topographic features, such as valleys, ridges, hilltops and plateaus were successively visited by survey teams comprising three or four

individuals who were instructed to search for artefacts and features within their predefined area. They were to some extent guided by the location of features that were already pinpointed on satellite imagery and aerial photographs but were explicitly instructed to also search in areas where no features had yet been documented.

Site definition

The Jebel Qurma project uses a methodology in which a number of structures and artefacts were grouped to form sites. Sites were defined as an assemblage of archaeological and/or epigraphic remains, including artefacts, structures, inscriptions, and petroglyphs that were spatially clustered within an area bounded either by prominent topographic features or by arbitrary boundaries. These parameters are fluid to some degree as, for example, spatial clustering is not easily established objectively in the field. Furthermore, this kind of site definition does not make a distinction between, for example, periodization or features types, such as between domestic structures and funerary structures. Also, since every artefact or feature becomes part of a site even when such remains are found in isolation, great variability exists between site size and composition. Some of the sites, for example, cover multiple hectares and comprise dozens of stone-built features, hundreds of pieces of rock art, and countless artefacts, whereas other sites consist of a single inscription or only a few stray artefacts (Fig. 3.4). It is thus important to realise that, in the Jebel Qurma project, the term 'site' does not equate to 'settlement', but is little more than a collection of spatially clustered finds.

Figure 3.4: Sites of varying sizes. Left: The very large site of QUR-162 comprising several large enclosures and other features. Right: QUR-250 – a small site comprising a single isolated stone feature.

Documentation structure & methods

Documentation of sites, structures, artefact distributions and rock art during the survey activities of the Jebel Qurma project were documented in the field using paper forms, sketch drawings and photographs. Here, the documentation structure is outlined. Sites were defined on the parameters outlined above and designated a site number (1, 2, 3…) after a prefix – QUR-… for sites in the *harra* landscape and HAZ-… for sites in the Hazimah plains. For each site a sketch drawing was made. When available, these drawings were based on aerial photographs, high resolution satellite imagery, or footage made with an Unmanned Aerial Vehicle (UAV or *drone*). The drone used by the Jebel Qurma project was a Phantom 2 Vision+ mounted with a 14 megapixel camera. When such imagery was not available sketch drawings of inevitably less detail were produced. On these sketches the local topography was recorded as well as anthropogenic remains. General photographs were made of the site and its location and on paper forms the location and nature of the site was described in detail.

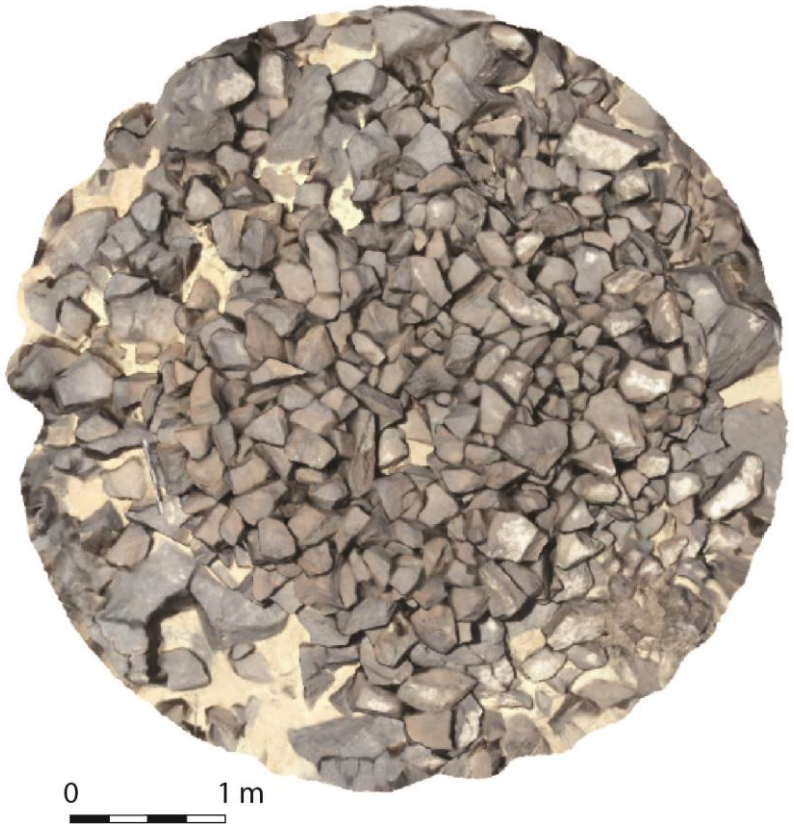


Figure 3.5: Photogrammetrically reconstructed top view of a cairn (QUR-943, Structure 13).

Each site could contain a number of structures, each of which was assigned a structure number (1, 2, 3…). These structures, which included cairns, enclosures, shelters, etc., were described using paper form, photographed and their location was recorded using handheld GPS devices. A sketch drawing was also made of each structure, which could sometimes be based on aerial photographs. Some of these structures were also documented through photographs that were later combined using photogrammetric software – in this case Agisoft Photoscan Professional – which results in a much more detailed rendering of a structure compared to handmade sketches (Fig. 3.5).

Apart from structures, sites were assigned loci, or areas, in which artefacts were counted and collected. The borders of these loci were defined architecturally, topographically, or arbitrarily. For each locus a form was filled out to document information such as slope, surface cover, and the number of artefacts counted and collected. Usually all pottery sherds were collected from a site given the general scarcity of pottery sherds, whereas chipped-stone artefact scatters were usually sampled. Other small finds, such as beads and coins were documented and collected when the material needed further study.

Inscriptions and petroglyphs were recorded in detail on paper forms as well. Their location was recorded in different ways, either by indicating them on the site plan or by using devices such as handheld GPS or – especially when clusters of rock art were particularly large – more precise equipment such as a Total Station or Differential GPS.[1]

Processing of finds and data coming from the field during survey activities was done at the project's base camp. Such processing included inputting paper forms into a digital database; washing, drawing and registering artefacts such as pottery, chipped-stone artefacts and other small finds; storing spatial data in a GIS; and photogrammetric processing. At the end of each field campaign artefacts were stored in storage facilities of the Department of Antiquities of Jordan.

Challenges

Data inconsistencies

Although the aim of the Jebel Qurma project is to systematically document archaeological and epigraphic remains within its survey area some problems in data consistency have occurred, which need to be

[1] For more detailed information on documenting inscriptions and petroglyphs, see Brusgaard (forthcoming) and Della Puppa (forthcoming).

made explicit. In the earlier survey seasons, mostly during the 2012 season but also to some degree during the 2013 season, not every structure or piece of rock art has been spatially pinpointed using a GPS device. Rather, during these seasons only site locations were pinpointed with a GPS, while the location of its component features was indicated only on site plans. Therefore the spatial data from these earlier seasons is somewhat less detailed, and this issue has to be taken into account in later spatial analyses (Chapters 4 and 5). Another issue is that over the years the visual documentation of structures has changed to some degree. Where hand-made sketches were made of structures during the earlier survey seasons, i.e. the 2012, 2013 and 2014 survey campaigns, in the 2015 and 2016 campaigns photogrammetric documentation has taken over hand-made sketches to some degree. Thus, a number of structures were documented in a much higher level of detail – something that needs to be taken into account when comparing different structures.

Buried sites

As was noted already on the basis of satellite imagery and aerial photography (Chapter 2) some of the archaeological features in the Jebel Qurma region have been partially buried by aeolian sand deposits. About 13.5% of the sites documented through pedestrian surveys were present in areas characterised in Chapter 2 as being covered, either partially or completely, by such deposits (Fig. 2.16). Although the presence of such deposits does not necessarily imply that architectural features are completely buried (see Fig. 2.19), smaller remains such as rock art and artefacts may become completely buried and thus invisible for detection during pedestrian surveys. This has implications for the amount of datable remains, and therefore sites, in these parts of the study area. This issue should be taken into account when studying the distribution of archaeological remains on a landscape scale (see Chapter 4).

The same may hold for areas where fluvial deposits are present, which is most significantly the case in the Hazimah plains (see Chapter 2). Find-numbers in terms of sites, architectural features, artefacts, and rock art are all considerably lower in the *hamad* landscape in comparison with the *harra*. Whether this can be attributed to fluvial deposits covering archaeological remains is at this point impossible to say. Whatever the case, there are more factors that possibly contributed to this situation as well. The limited availability of stone building material, for example, may also have contributed to the scarcity of architectural features in the *hamad* landscapes, while the soft lime- and sandstone present in the *hamad* may have been unfavourable for the preservation of pre-Islamic carvings.

Palimpsest situations

A variety of palimpsest situations occur in the Jebel Qurma region, and these were encountered on numerous occasions. Remains present on the surface, as documented through pedestrian and remote sensing surveys (Chapter 3), were often found to be of widely varying temporal origin, i.e., from prehistoric up relatively recent times. A relevant example in this respect is the temporal variation in artefacts found at residential sites. It often proved difficult to make associations between datable remains, such as ceramics, and non-datable remains such as enclosures. Such problems are not easily overcome, as indicated by excavations. For example, it was difficult to establish a relationship between architectural remains and the Safaitic inscriptions often encountered on- or around them. This was only possible when such inscriptions were truly incorporated in these structures, i.e., when a stratigraphic relation could be made, which was not the case in the majority of situations.

The palimpsest situations encountered over the course of this study are the result of seemingly limited accumulation deposits in distinct stratigraphic sequences. Through excavations carried out within enclosures deposits with limited depth and stratigraphy were often encountered. Various processes may have contributed to such situations, including limited anthropogenic deposition of materi-

als, limited deposition of natural and clearly distinguishable sediments, and perhaps even erosion processes such as deflation, although the latter is difficult to establish with certainty.

Looted sites

The remote sensing study and fieldwork in the Jebel Qurma region has widely documented evidence for recent looting of archaeological features. Burial cairns appear to be the prime target of looting activities, as these are believed to contain precious objects. But other types of features have become subjected to looting as well, such as enclosures (see Chapter 4). All of these looting activities are detrimental for the preservation of archaeological features, the cultural landscape they are part of, and the archaeological research that pursues understanding the development of these landscapes and of their past inhabitants.

While it is by no means the aim to justify such looting activities here, it should be noted that they have a limited positive side-effect for research purposes. In a number of cases looting exposed archaeological remains within features that would not have been visible on the surface otherwise, such as human skeletal remains, fire pits, and architectural features, which could be used to further steer the fieldwork strategy with regard to what to excavate and where.

3.3. REMOTE SENSING: OBJECTIVES AND METHODS[2]

3.3.1. Remote sensing objectives

Prior to actual field campaigns in the Jebel Qurma region a detailed assessment of the archaeological remains in the area was made through a remote sensing study, using aerial photographs and optical satellite imagery. The advantages of using such imagery in archaeological studies of the Black Desert has long been acknowledged. In fact, the earliest interest in the Black Desert was fostered by the publication of aerial photographs of stone structures on the surface in the early 20th century (see Chapter 1). The extraordinary good preservation and visibility of stone features makes them ideal to be studied from the air and from space. Recent advances in the availability of aerial photographs and high resolution satellite imagery have further added to the potential of remote sensing studies in the Black Desert (Kennedy 2011). Caution, however, is also warranted is using remote sensing data. Even though an enormous amount of features can be detected in the Black Desert using aerial and satellite photos, actual pedestrian surveys and excavations are still required to check and provide more detailed information on the information acquired from above.

The aims of the remote sensing study of the Jebel Qurma region was twofold: (a) to study the distribution of archaeological features in regions not covered by pedestrian surveys and (b) to better study large linear features that are difficult to document on the ground given their size.

3.3.2. Remote sensing methods

Imagery selection, acquisition, and processing[3]

The first type of imagery that was acquired for the detection of archaeological features in the Jebel Qurma region was CORONA satellite imagery. These images were initially produced by a USA espionage programme in which a number of CORONA satellites were launched to observe the earth's surface. These satellites have produced photographs between 1959 and 1972, and were declassified by the USA government, and since then available for archaeological research, in 1995 (Beck 2004, 134-5). Digital

[2] The remote sensing study presented here was carried out between 2011 and 2013 (Huigens 2013). Only after this period high resolution imagery of the study area became available on open source web mapping services and virtual globes such as Bing Maps and Google Earth, and is therefore not included in this study.

[3] See Appendix A for more detailed information of imagery processing in ArcGIS.

copies of the imagery are now freely available online through the website of the United States Geological Survey (USGS). The imagery is panchromatic (black-and-white) and has different spatial resolutions – varying between 12.2 and 1.8 m per pixel – depending on the camera used on a specific satellite (Galiatsatos 2004, Table 2-2).

For the purpose of this study two CORONA satellite images were acquired from the USGS, together covering the extent of the study area (Fig. 3.6). These photographs were taken in 1968, and have a spatial resolution of ca. 2.3m. This resolution is high enough to document large archaeological fea-

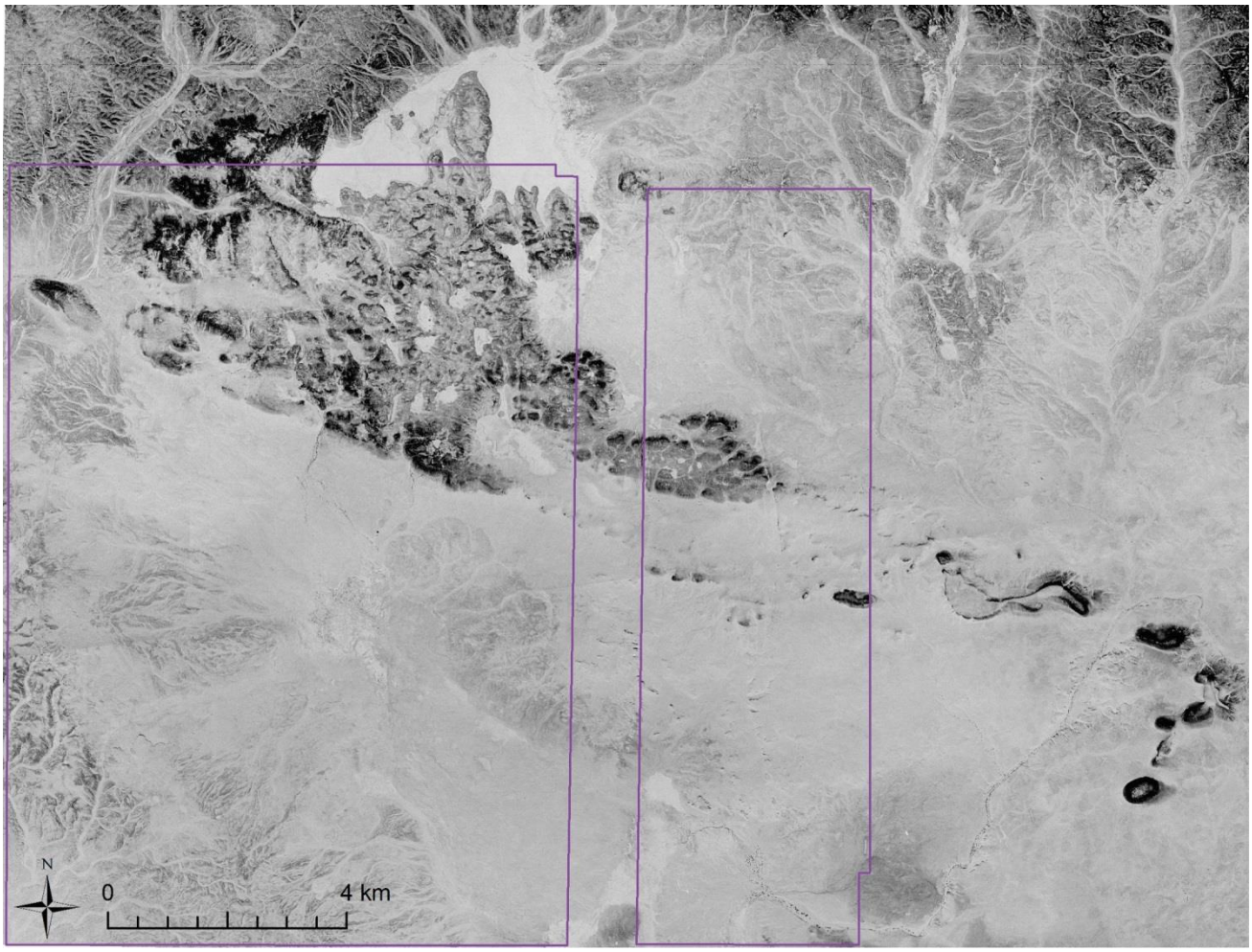


Figure 3.6: Corona imagery of the Jebel Qurma region (courtesy of the USGS) with the extent of available Ikonos imagery indicated in purple.

tures such as walls and large cairns (Fig. 3.7). These images came in digital TIFF format but did not have spatial reference data. They were first mosaicked in Photoshop. Following Casana & Cothren (2008, 4-6), who used geocoded imagery to georefence ungeocoded imagery, the mosaicked image was imported in ArcGIS and manually georeferenced using the software's Georeferencing tool, using 15 m spatial resolution Landsat imagery as a reference. The final step in processing the imagery was to orthorectify the imagery to remove image distortions using ArcGIS orthorectification tool. The SRTM DEM was used as a reference to correct these distortions.

The second imagery type used for documenting archaeological features in the Jebel Qurma region was Ikonos imagery (see Chapter 2). The spatial resolution of this imagery is about 80 cm – considerably higher than CORONA imagery – and it is therefore more useful for the detection of small features (Fig. 3.7). This imagery, however, is expensive and could not be acquired for the entire study area but only for part of it. The imagery extent covered 172.1 km^2, i.e. about 50% of the study area, including

the majority of the basalt landscapes of the Jebel Qurma region and most of the Hazimah plains to the south, as well as most of the WorldDEM data extent (Fig. 3.6). Many of the basalt-covered table mounts in the eastern part of the study area fall outside the imagery extent.

In addition to satellite imagery aerial photographs were obtained of a large number of archaeological sites in the Jebel Qurma region. These photographs were made by the Aerial Photographic Archive for Archaeology in the Middle East (APAAME) project. The APAAME project comprises a flying programme in which aerial photographs of archaeological sites in Jordan are made and archived online. Although the flying programme includes Jordan as a whole, one of the major foci of the project is the archaeology of the Black Desert, of which tens-of-thousands of photographs are available. The advantage of these photographs is that they were shot at low altitude with high-resolution handheld cameras, and are thus of much higher resolution than satellite imagery (Fig. 3.7). The geographic location of where the photos were taken are contained in the photographs' metadata, and can be imported into ArcGIS. A drawback of these photographs is that many of them are taken from an oblique angle and proper orthorectification is often very time-consuming and sometimes impossible through a lack of adequate ground control points. A total of 541 APAAME aerial photographs were obtained for remote sensing purposes at reproduction cost. Their geographic location was imported from their metadata into ArcGIS. Orthorectification of the photographs was only done for a few photographs given the difficulty of finding adequate ground control points.

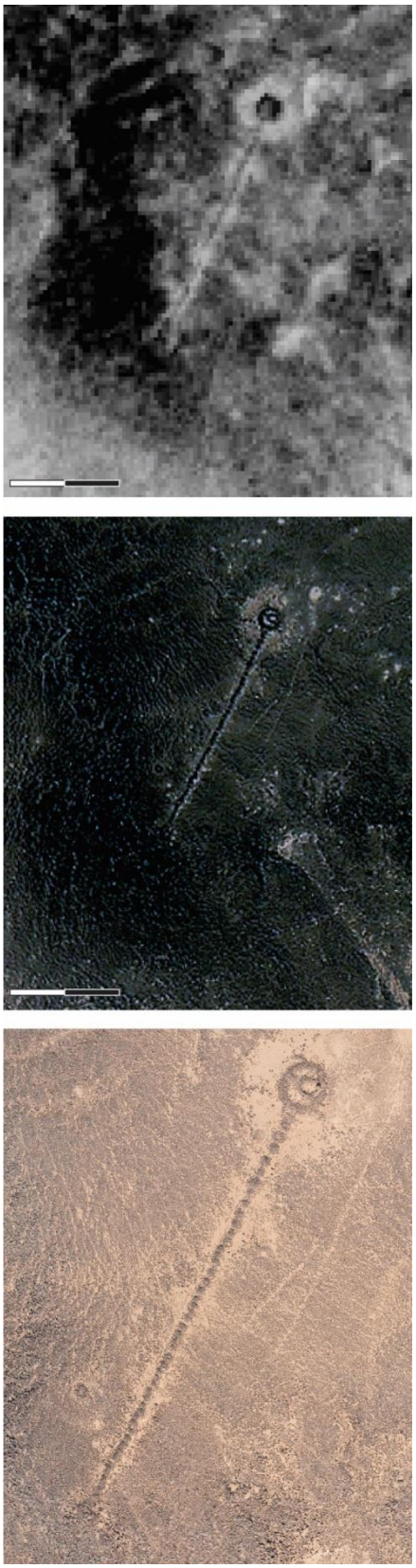


Figure 3.7: An archaeological feature observed on various imagery types. Top: Corona satellite image (courtesy of the USGS). Middle: Ikonos image (courtesy of Jordan Oil Shale Company). Bottom: APAAME image (photo by David Kennedy, courtesy of APAAME). Scale is 100 m.

Feature detection and documentation

For the detection of archaeological features on the satellite imagery and aerial photographs a strategy of systematic manual detection was chosen. For the satellite imagery, this entailed the visual detection and marking of potential archaeological features in ArcGIS. To ensure a systematic workflow a 1x1 km grid was created overlying the imagery, thus dividing the imagery into smaller areas that could be studied consecutively. The imagery was studied for anomalous features such as linear and circular features that were subsequently marked with points in ArcGIS. Particular attention during the detection of features was paid to what can be called 'negatives'. As noted above, in the basalt landscapes windblown sediments have accumulated between basalt clasts. This means that when clasts are removed to create features such as walls and cairns a layer of lightly coloured soil is exposed that strongly contrasts with the built feature. This contrast between the feature and its negative is very

well detectable from above, on both aerial photographs and satellite images (Fig. 3.8). This is not the case, however, in other landscapes consisting mainly of sedimentary rocks. For example, in the Hazimah plains to the south of the Qurma plateau archaeological features made of local limestone stand out much less clearly against the surrounding surface, as both are lightly coloured. This greatly hampers the visibility of stone-built features in the *hamad* landscapes.

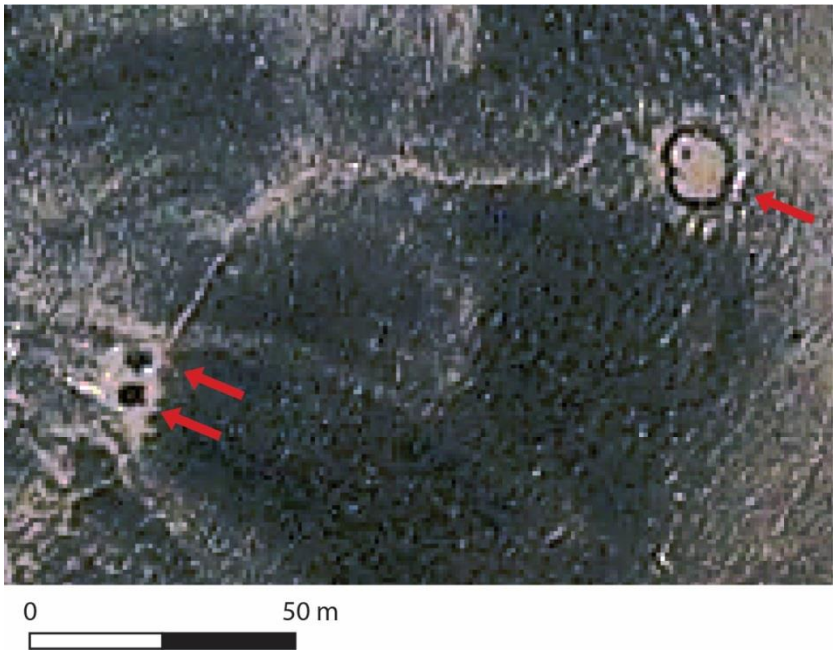


Figure 3.8: Example of Ikonos imagery showing two cairns, a small enclosure, and a path running between them.

The detected potential features were given a unique number and a number of variables were recorded for each of them, including type, shape, size, and the type of imagery on which the feature was recognised. Type included relatively straightforward categories, largely based on previous remote sensing studies of stone features in the Black Desert (e.g. Kennedy 2011; Kennedy & Bishop 2011). Feature sizes were measured with the ArcGIS measure functionality, for which a margin of error should be taken into account related to the spatial resolution of the imagery.

A somewhat different method was used for the detection and documentation of archaeological features on the APAAME aerial photographs. These photographs were studied separately without being incorporated in the GIS. A photograph was selected for each unique archaeological feature and then added to the GIS to visualise its geographic location as a point. These points were then added to the general shapefile that also contained the points of the features recognised on satellite imagery. Information was then added to the shapefile's table for each variable except size, since most of the images could not be orthorectified properly and therefore measurements could not be taken.

3.4. THE HELLENISTIC TO EARLY ISLAMIC-PERIOD LANDSCAPE: DATABLE SURFACE REMAINS AND ASSOCIATED FEATURES

Through surface surveys in the Jebel Qurma region a wide variety of archaeological and epigraphic remains were documented. Some of these remains could be attributed with relative ease to certain periods while for others the date was highly uncertain or completely unknown. Relatively well-datable remains included ceramics and other artefacts as well as inscriptions and petroglyphs. These remains are discussed here first as they provide, to a considerable degree, the basis on which stone-built features were dated – at least in a tentative fashion. The nature and chronology of these stone-built features will therefore be discussed in the next section.

3.4.1. Ceramics

The ceramics collected during pedestrian surveys in the Jebel Qurma region present a unique corpus from the Black Desert. During the five survey seasons carried out there a total of 8597 ceramics were

encountered and collected. 829 (9.6%) of these sherds included rims, bases, handles and decorated body sherds, and were potentially diagnostic, i.e. datable with a variable degree of precision to a particular time period. The high number of sherds is by no means comparable to other regional projects in the Black Desert, where ceramics are hardly reported. It is doubtful, however, that the Jebel Qurma region is unique in the widespread occurrence of ceramics. Rather, it would seem more likely, given the focus on the prehistoric periods of many other projects, that there simply has been little interest in the collection, or at least publication, of pottery sherds.

For the purpose of this study the ceramic corpus from the Jebel Qurma region is important for a number of reasons. Firstly, they potentially serve as chronological markers for human occupation of the Jebel Qurma region in general and of individual sites in particular, during the Classical and Late Antique periods. While chipped-stone artefacts have been used as such to identify prehistoric sites in the Black Desert (e.g. Betts et al. 1998; 2013) ceramics may serve a similar purpose when studying the historical periods. Secondly, ceramics may be helpful in the identification of ancient activity areas. This is especially relevant when attempting to identify nomadic campsites, where domestic waste, including pottery sherds, may be encountered. Thirdly, ceramics may provide information on regional exchange relations, which is obviously the case when at least some of the ceramics are not locally produced but imported from elsewhere. This is potentially informative about relationships of mobile peoples with sedentary communities from which ceramics may have derived.

Challenges

Dating and classifying the ceramics from the Jebel Qurma region posed a number of problems. Firstly, there was a lack of local ceramic sequences from which a chronology could be derived. Well-stratified ceramics were hardly encountered during excavations within the region itself (see Chapters 4 and 5), which rendered impossible the creation of a local ceramic typology. Dating the diagnostic pottery sherds was therefore only possible on the basis of published ceramic corpora from other excavated and well-dated contexts. Corpora that could have been useful in this respect, including the potentially well-stratified remains from the Roman military structures in the Azraq region, have unfortunately not yet been published in detail. Instead, the closest comparative material comes from urban and rural settlements situated much further to the west (see below). This absence of local ceramic sequences probably has a negative influence on the number of datable ceramics.

Secondly, the chronological resolution of the datable ceramics is usually limited. The number of ceramics that are usually closely datable, such as high-quality fine wares and amphorae, is very low. Coarse wares predominate within the ceramic corpus, while there is a total absence of *terra sigillata* wares and Nabataean Painted Fine Wares. Coarse wares are usually difficult to date with much precision, i.e. to a century or less, and ceramics from the Classical and Late Antique period are not different in this respect.

Thirdly, possibilities of dating the ceramics is further reduced by the high fragmentation rates observed within the corpus. The average weight of only 15.7 grams per potential diagnostic sherd may be telling in this respect. Two factors that may have contributed to this high fragmentation degree are the scarcity of high quality ceramics and the fact that the surface ceramics were probably exposed for relatively long periods of time to weathering and trampling.

Finally, there are differences in the amount of knowledge about pottery traditions from different time periods. This can be because during some periods less distinctive pottery types were produced, or because some periods are simply better studied that others. While ceramics from the Roman period are relatively well studied, Hellenistic-period pottery – except perhaps for fine Nabataean wares – are relatively poorly known. There are also problems with Late Antique pottery, as differentiating between

Byzantine and Umayyad-period pottery is often difficult, while Abbasid period pottery is poorly known. These issues may create certain dating biases that need be taken into account.

Documentation method

During field surveys in the Jebel Qurma region ceramics were collected according to the loci that were defined in the field, and each lot of materials from these loci was first sorted out into batches according to fabric and form (base, rim, body, etc.). A total of twelve broad fabric groups were defined based on initial studies of the ceramic corpus by ceramic specialists affiliated with the field project. These fabric groups were defined on the basis of the composition of the ceramic corpus rather than on comparative grounds, since no comparative material from the region or its vicinity are available. The fabric groups that were defined that are relevant for this study are presented in Table 3.1. Batches were then counted, weighed, and coded. The diagnostic ceramic sherds were subsequently documented in more detailed, as they were coded, drawn and photographed.

Code	Name	Description
B	Buff Ware gritty	Wheel-made; hard fired; completely oxidizing; abundant mineral inclusions; medium coarse in general; buff to light buff calcareous clay.
C	Red Ware gritty	Wheel-made; hard fired; variable firing: from completely oxidizing to incompletely oxidized dark core; iron-rich clays; reddish to reddish brown colours; mineral inclusions very variable in sizes, sorting, quantities, and kind.
D	Red Ware compact	Wheel-made; hard fired to very hard; clinky sound; iron-rich clays; reddish to reddish brown colour; variable firing: completely oxidizing to incompletely oxidized dark core; mineral inclusions of low densities and small size.
E	Buff Ware compact	Wheel-made; hard fired; completely oxidized; calcareous clays; light, buff colour; mineral inclusions of low densities and small size.
F	Basalt Ware gritty	Hand-made; low/short firing; incomplete reduction; emphasis on very strong mineral temper of a predominantly basalt kind; large amounts of mostly large to very large inclusions and low density of small-medium size plant inclusions; iron rich clay; reddish to reddish brown surface colour but quite dark.
G	Pink Ware gritty	Hand-made; mostly oxidized firing but may also be incompletely oxidized with grey core; strong mineral temper; medium size to large inclusions of various kinds and small densities of small/medium size plant inclusions.
H	Grey Ware gritty	Wheel-made; iron-rich clay, but fired in such a way as to induce grey, dark grey to black surface colour; no plant inclusions; mineral inclusions; small/medium-sized and variable densities.
I	Grey Ware compact	Similar to H, but with compact fabric with few to no macroscopically visible inclusions.

Table 3.1: Descriptions of fabrics attested in the Classical/Late Antique ceramic material from the Jebel Qurma region. Defined by O. Nieuwenhuyse and D. Peeters.

Comparative analysis

The dating of the ceramics collected during the field surveys was entirely based on comparisons with published ceramics from excavated contexts. Mostly primary excavation data that contained information on the stratigraphy and dating methods were used for this purpose, to be able to ensure the accuracy of the parallels. Most parallels were found in excavation reports from a number of sites in the southern Levant. Other sources included typo-chronological studies based on datasets from various excavated context. Descriptions of the find contexts of these parallels and the way in which they were dated can be found in Appendix B.

A note on periodization

Notoriously, historical periods are termed and dated in different ways, largely following differences in research tradition, the issues under investigation, and differences in local historical developments. It is therefore warranted to describe briefly the way in which various historical periods are defined in this research. Although there is no local tradition of periodization of phases of inhabitation in the Black Desert, especially not for the historical periods, common terminology and associated dates were adopted from neighbouring regions, in such a way that they more or less reflect the local socio-political history. These periods are sometimes arbitrarily broken down here into an 'early' and 'late' period. The periodization used in this research is shown in Table 3.2.

Period (broad)	Period (narrow)	Date range
Iron Age II		1000 -332 BC
Hellenistic	Early	332 - 100 BC
	Late	100 BC - AD 106
Roman	Early	AD 106 - 200
	Late	AD 200 - 324
Byzantine	Early	AD 324 - 500
	Late	AD 500 - 634
Early Islamic	Umayyad	AD 634 - 750
	Abbasid	AD 750 - 969
Fatimid		AD 969 - 1171

Table 3.2: Periodization used in this research.

Much of the terminology is derived from the socio-political situation in the settled parts of the southern Levant, and one may wonder whether such terminology has any relevance in relation to nomadic communities of the Jebel Qurma region. After all, these communities would not have identified themselves as 'Roman' in the early 1st millennium AD. The term 'Byzantine' may be regarded as a misnomer in similar ways, but also for the fact that what we now call the Byzantine Empire was by contemporaries still regarded as 'Roman' (Treadgold 1997). What this terminology does relate to, then, are conventions of the archaeological discipline derived from broad culture-historical developments and event which are used to provide some historical frame of reference.

The end of the Iron Age II period and the beginning of the Early Hellenistic period, then, is set here at 332 BC, marked by the conquest of Alexander the Great of the southern Levant (Berlin 2003; Magness 2012, 6). The Late Hellenistic period is more or less contemporaneous with the Nabataean kingdom, which was annexed by the Roman Empire in AD 106 (cf. Schmid 2008, 360-378). The transition from Roman to Byzantine is placed at AD 324, following Parker (1986) and Watson (2008) who take the end of the Roman tetrarchy and the succeeding reign of emperor Constantine – who moved the capital from Rome to Constantinople – as a starting point. The Early Islamic period starts with the Islamic conquest of the Syrian desert and the Hauran under Abu Bakr, the first Rashidun caliph in AD 634. Between AD 661 and 750 the caliphate was ruled by the Umayyad dynasty (Donner 1981; Kennedy 1986). As it would be pointless to subdivide the beginning of the Early Islamic period into a Rashidun

and Umayyad period, the period between AD 634 and 750 is here simply referred to as the Umayyad period. The Abbasid period coincides with the rule of the Abbasid dynasty from AD 750 up to AD 969, when the Fatimid caliphate established its capital in Egypt and subsequently advanced into the southern Levant (cf. Gil 1992; Kennedy 1986, 318-320).

Results

On the basis of the comparative analysis a total of 98 diagnostic pottery sherds could be dated to Classical and Late Antiquity. A catalogue of these sherds is found at the end of this chapter (§ 3.7.: Table 3.6 & Fig. 3.46). Table 3.3 shows the number of sherds per attested period. There is a rather large variability in the chronological range of individual ceramics, as some of the sherds could be dated quite closely while others show a much wider date range. This is why Table 3.3 is subdivided into three sections, showing the number of sherds that could be dated according to a fine, medium, and coarse chronological resolution. This is simply the result of both differences in the 'lifespan' of pottery styles and differences in the chronological resolution of excavated contexts. Importantly, there are no ceramics that could be securely attributed to the Iron Age or Early Hellenistic period, and generally, the number of ceramics that are securely dated to the Hellenistic and Roman periods seems to be low, i.e. 13 out of 98 sherds (13.3%). The majority of the dated ceramics were attributed to the Byzantine and Early Islamic periods (65.3%). Additionally, there are many sherds (16.3%) that could be either Hellenistic/Roman or Byzantine/Early Islamic. Given the fact that the majority of sherds is from the Byzantine/Early Islamic period, it is likely that these sheds with a coarse chronological resolution date to Late Antiquity as well. Also important is the scarcity of Fatimid-period pottery (1%) and the absence of ceramics from the Ayyubid/Crusader period.

Period	Number of sherds	% (of sub-totals)
Fine chronological resolution		
Iron Age II	0	0,0%
Early Hellenistic	0	0,0%
Late Hellenistic	1	3,2%
Early Roman	0	0,0%
Late Roman	2	6,5%
Early Byzantine	2	6,5%
Late Byzantine	7	22,6%
Umayyad	11	35,5%
Abbasid	7	22,6%
Fatimid	1	3,2%
Sub-total	**31**	
Medium chronological resolution		
Iron Age II/ Hellenistic	1	1,8%
Hellenistic	3	5,4%
Hellenistic-Early Roman	1	1,8%
Late Hellenistic-Early Roman	2	3,6%
Roman	4	7,1%
Roman-Early Byzantine	1	1,8%
Roman-Byzantine	2	3,6%
Late Roman-Byzantine	4	7,1%
Byzantine	5	8,9%
Byzantine-Early Islamic	6	10,7%
Byzantine-Umayyad	1	1,8%
Late Byzantine-Early Islamic	18	32,1%
Late Byzantine-Umayyad	3	5,4%
Early Islamic	4	7,1%
Abbasid-Fatimid	1	1,8%
Sub-total	**56**	
Coarse chronological resolution		
Iron Age II/Umayyad	1	9,1%
Hellenistic-Early Islamic	1	9,1%
Late Hellenistic-Byzantine	1	9,1%
Late Hellenistic-Early Islamic	1	9,1%
Roman-Early Islamic	1	9,1%
Late Roman-Umayyad	4	36,4%
Late Byzantine-Middle Islamic	1	9,1%
Early-Late Islamic	1	9,1%
Sub-total	**11**	
Total	**98**	

Table 3.3: Number of dated ceramics per period collected during pedestrian surveys (see also the catalogue of dated ceramics: § 3.7).

Little chronological distinctiveness is observed within the fabrics of the dated ceramics. Figure 3.9 shows the occurrences of different fabrics divided over two broad periods – the Hellenistic/Roman period and the Byzantine/Early Islamic period. Although Hellenistic/Roman sherds are mostly made of red fabrics while Byzantine/Early Islamic sherds are mostly of buff and grey fabrics, all fabric types occur in both broad chronological periods. It therefore seems impossible at this point to ascribe any of the fabric groups to a particular period.

3.4.2. Other artefacts

Only few prehistoric ceramics have been identified in the Jebel Qurma region (see Akkermans & Brüning 2017), and pottery sherds from the 2nd and early 1st millennium are completely absent so far. Instead, the remainder of the dated ceramics at this point seem to date to more recent periods – mostly the Mamluk and (early) modern periods (Akkermans & Huigens in press).

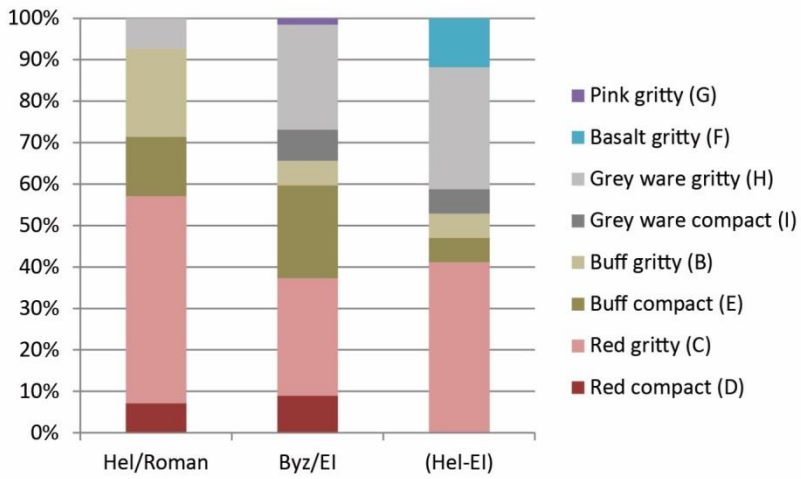


Figure 3.9: Occurrences of fabrics in the Hellenistic/Roman period (Hel/Roman) and the Byzantine/Early Islamic period (Byz/EI). The final column shows fabrics that could only be assigned to the Hellenistic to Early Islamic periods.

Other than ceramics, very few other artefacts were encountered that could be securely attributed to the Hellenistic to Early Islamic occupation phase. An exception is a single silver coin that was found on the slopes of a looted burial cairn, which was identified as a Seleucid tetradrachm minted in Tyre under the reign of Antioch VII (Fig. 3.10). Fragments of artefacts made of materials such as bronze, iron, and glass were found as well. Although such material may also originate from the period of study, these fragmentary remains mostly remain largely undatable.

Figure 3.10: Silver tetradrachm minted in 130/129 BC under Antioch VII in Tyre. The grey-brown colour represents tarnish. From a looted cairn at QUR-238, inventory number QUR238/A1. Photos by P. Akkermans.

Material that was datable to earlier phases of inhabitation, i.e. in prehistory, was present in the form of many thousands of chipped-stone artefacts (Akkermans et al. 2014). At this point, there is no reason to believe that flint implements were used by inhabitants of the Jebel Qurma region in more recent times. Modern artefacts were found in the form of trash such as plastics, bullet casings, paper, and metal and glass containers, which were left behind by Bedouin and other occasional visitors to the region such as hunters, truckers, grave looters, and so on.

3.4.3. Inscriptions and petroglyphs

A large amount of rock art was documented in the Jebel Qurma region, which can be broken down broadly into inscriptions and petroglyphs (Fig. 3.11). Inscriptions are carvings of texts in various scripts while petroglyphs are defined as all non-textual carvings, which include zoomorphic and anthropomorphic figures as well as geometric shapes. Various scripts have been attested in the Jebel Qurma region. Over 5000 pre-Islamic inscriptions were recorded, most of which were in Safaitic. Although these are conventionally dated between the 1st century BC and the 4th century AD (Macdonald 2004), this date is highly uncertain. References in the inscriptions to certain political events show that at least some of the inscriptions should date between the Late Hellenistic or Roman periods, but the timeframe of the writing tradition may nonetheless be broader (Al-Jallad 2015, 17). Although a more reliable dating framework is desirable, this study adheres to the Late Hellenistic-Roman date for the inscriptions.

A handful pre-Islamic inscriptions were written in other scripts, including Hismaic, which is dated between ca. 100 BC and AD 100, and Thamudic, which is very poorly dated but may range between the 6th century BC and the 3rd century AD (Della Puppa forthcoming; Macdonald 2004). Two Greek inscriptions were encountered as well (at QUR-2 and QUR-610), which may probably date anywhere between the Hellenistic and the Byzantine period. Associated with the Safaitic and other pre-Islamic inscriptions are thousands of petroglyphs (Brusgaard forthcoming). Although some pre-Islamic carvings have been documented in relative isolation, they are mostly found in clusters that may consist of over 800 individual inscriptions and petroglyphs.

Figure 3.11: Safaitic inscription and associated petroglyphs. QUR-64, RA-152. Scale is 20 cm. Photo by P. Akkermans.

Rock art that can be safely attributed to the Byzantine and Early Islamic periods is absent thus far. Although it is possible that the two Greek inscriptions are from the Byzantine period, they could equally be from older periods. Furthermore, although Arabic inscriptions abound, none of them is Kufic, i.e. from the Early Islamic period.[4] Rather, the earliest Arabic inscriptions in the study area are a few dozen texts from the 13th and 14th centuries AD, i.e. the Mamluk period (Abbadi 1986). The remaining Arabic inscriptions and associated pictorial carvings are modern.

3.4.4. Stone-built features

In addition to the artefacts and rock art described above the Jebel Qurma region hosts a large number of stone-built features of various types (Table 3.4). Although many of these represent fairly familiar feature types of the Black Desert many of these have thus far remained virtually undated. Through association with better datable surface remains – mainly ceramics and pre-Islamic carvings – an attempt will

[4] Based on preliminary readings of the Arabic inscriptions by Prof. Dr. Petra Sijpesteijn (Leiden) and Dr. Ilkka Lindstedt (Helsinki).

now be made to propose the date of construction and/or use of these features. This tentative chronology is further investigated in Chapters 4 and 5. What follows is a description of the different recognised feature types, including their proposed date of construction and use.

Feature type	Pedestrian survey area		Beyond survey area
	harra	*hamad*	
Enclosures (grouped)	141	7	45
Enclosures (single)	277	3	72
Clearings	365	1	65
Cairns	633	38	53
Pendants	30	1	20
Desert kites	11	0	5
Walls	99	6	5
Dwelling clusters	6	0	0
Wheels	21	0	8
Tent places	525	23	70
Graves	99	34	0
Desert mosques	21	0	0
Markers	333	9	0
Others/undefined	844	24	31
Total	**3405**	**146**	**374**

Table 3.4: Number of features per type as documented through pedestrian and remote sensing surveys in the Jebel Qurma region.

Enclosures

Enclosures are defined as walled structures enclosing a space that may or may not be cleared of basalt boulders (Fig. 3.12). Although enclosures are a well-known feature type of the Black Desert, their date of construction and use is largely unknown, and even their function remains unclear. Betts' survey and excavation programme targeted a number of enclosures as they were often associated with prehistoric remains – the main focus of her research. While in a limited number of cases her excavations seemed to suggest a prehistoric origin of enclosures, Betts generally remained cautious about assigning enclosures to a specific period. She often recognised multiple phases of use of the enclosures, evidenced either in multiple phases of construction of the walls, or through find material within and around the enclosures, but a lack of stratigraphy in the deposits made it difficult to securely correlate artefact assemblages with phases of construction (see Betts et al. 2013). In terms of function, Betts seems to support the idea that they were used as animal pens in the past (e.g. Betts & Cropper 2013, 184). On the other hand, the large amount of artefacts sometimes found in around enclosures may suggest that they were also used as residential areas (cf. Abu-Azizeh 2013). It is of course possible that either may be true, especially if enclosures were reused over a long time period, i.e. between prehistory and the present day.

In the Jebel Qurma region a total of 428 enclosures were documented during surface surveys. These were subdivided into two types: *single enclosures* and *grouped enclosures*. Single enclosures represents walling that encloses a single space while grouped enclosures are subdivided into a number of compartments. Single enclosures are most numerous.

Evidence for the use of a number of enclosures between the Hellenistic to Early Islamic periods is provided by the occurrence of ceramics from these periods within and directly around enclosures. This was the case at ten enclosures, while at another eleven sites where enclosures were present Hel-

lenistic to Early Islamic ceramics were attested, although not in direct association with enclosures. Further evidence for the frequentation of sites featuring enclosures during the period of study is provided by pre-Islamic inscriptions and petroglyphs that are sometimes found at these sites. In the case of eight sites, some of these inscriptions actually mention the presence or construction of an enclosure.[5]

While many of the enclosures were visited and possibly used during the period of study, many of them, however, were possibly constructed much earlier, i.e. during prehistory. Relatively large amounts of chipped-stone artefacts have been encountered within a number of enclosures (Akkermans et al. 2014; Huigens 2015). In fact, at 17 of the 25 sites for which there is evidence that one or more of the enclosures were occupied between Hellenistic and Early Islamic times large amounts of chipped-stone artefacts were encountered as well. It is therefore possible that the enclosures at these sites were reused rather than newly constructed.

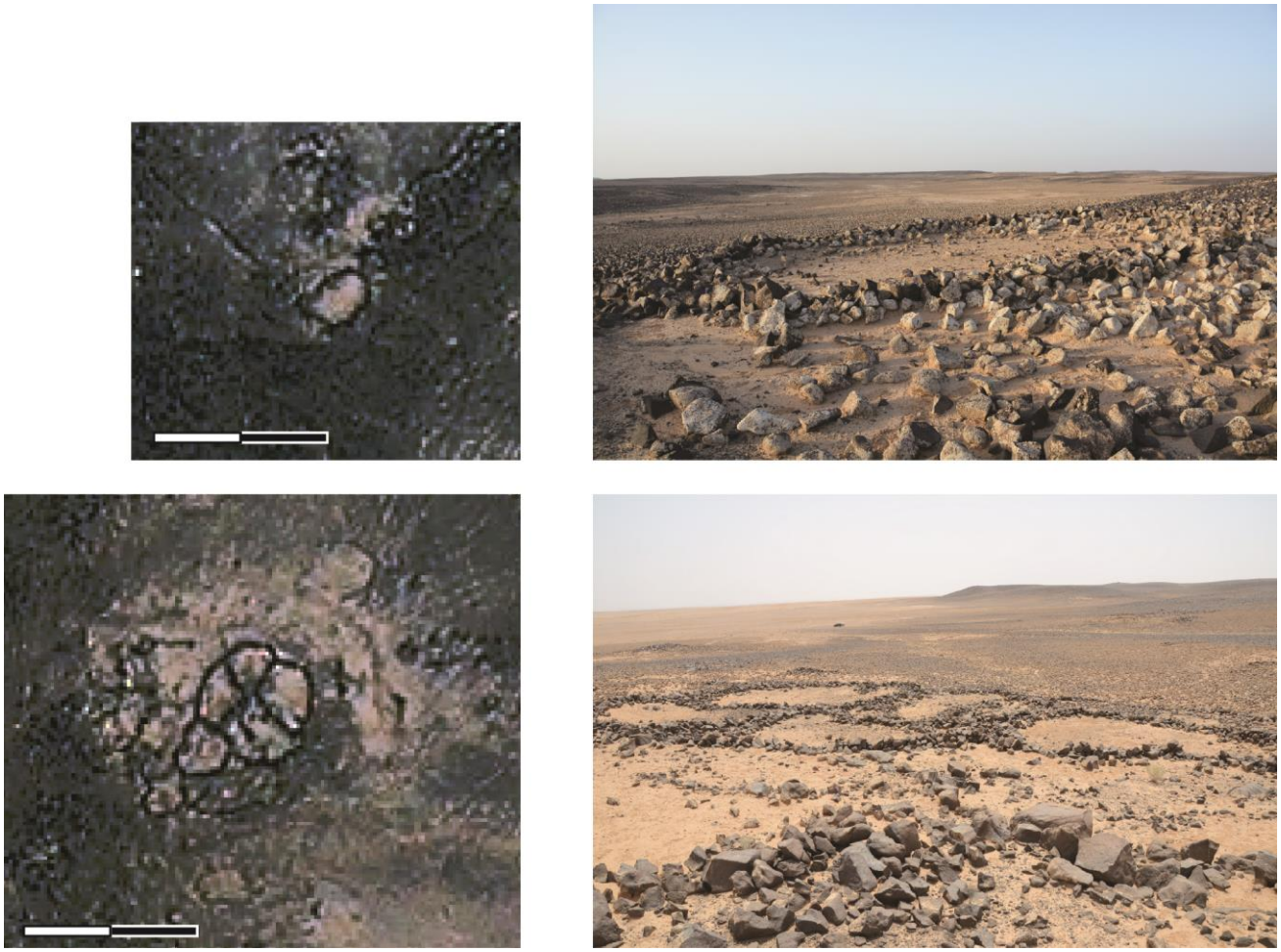


Figure 3.12: Enclosures in the Jebel Qurma region as seen from the air and on the ground. Top row: single enclosure at QUR-379. Bottom row: grouped enclosure at QUR-123. Scale is 40 m.

Clearings

Clearings are defined as surfaces that were cleared of their naturally occurring stone cover, yet not surrounded – or only to a limited extent – by stone walling (Fig. 3.13). Clearings are among one of the most understudied feature types of the Black Desert. Although they are not unique for the Jebel Qurma region, clearings are hardly described in most of the remote sensing or field studies that were previously

[5] Enclosures are identified by the Old Arabic word *ẓrt* (Della Puppa forthcoming). The enclosures to which the inscriptions most likely refer are found at the sites of QUR-20, QUR-1016, QUR-175, QUR-185, QUR-206, QUR-210, QUR-734, and QUR-974 (See Table 3.5).

carried out in the Black Desert. A notable exception is the study by Kempe & Al-Malabeh (2010), in which these clearings are documented through remote sensing. However, it has remained completely unknown when these clearings were made and used, and for what purpose. Tentatively, a number of possibilities in terms of function can be posed. First, they may represent areas that were used for residential purposes, i.e. to pitch small tents or huts, or to pen animals, although in the latter case the actual pens must have been made of perishable materials. An alternative hypothesis is that these areas were cleared of basalt to stimulate the growth of pasture – a practice that is known from ethnographic accounts and archaeological contexts (e.g. Chang & Koster 1986; Hammer 2014). These hypotheses remain to be tested.

A large number of clearings were documented through pedestrian surveys (Table 3.4). They seem to be confined entirely to the *harra* landscapes where the rock cover is usually much denser than in the *hamad*. The size variability among clearings is rather large. The smallest clearings may only be a few meters across, while the largest cover an area up to about 1 ha.

Evidence for the use of a small number of clearings during the Classical and Late Antique period comes from ceramics, which were encountered on or directly around 14 clearings. Evidence for earlier (prehistoric) use of these clearings is limited, but they were extensively reused in relatively recent times. In many cases remains of recent Bedouin campsites, including modern trash associated with rectangular tent outlines and animal pens (see below), are found on the clearings. Importantly, it is difficult to identify ancient features at these clearings, such as remains of residen-

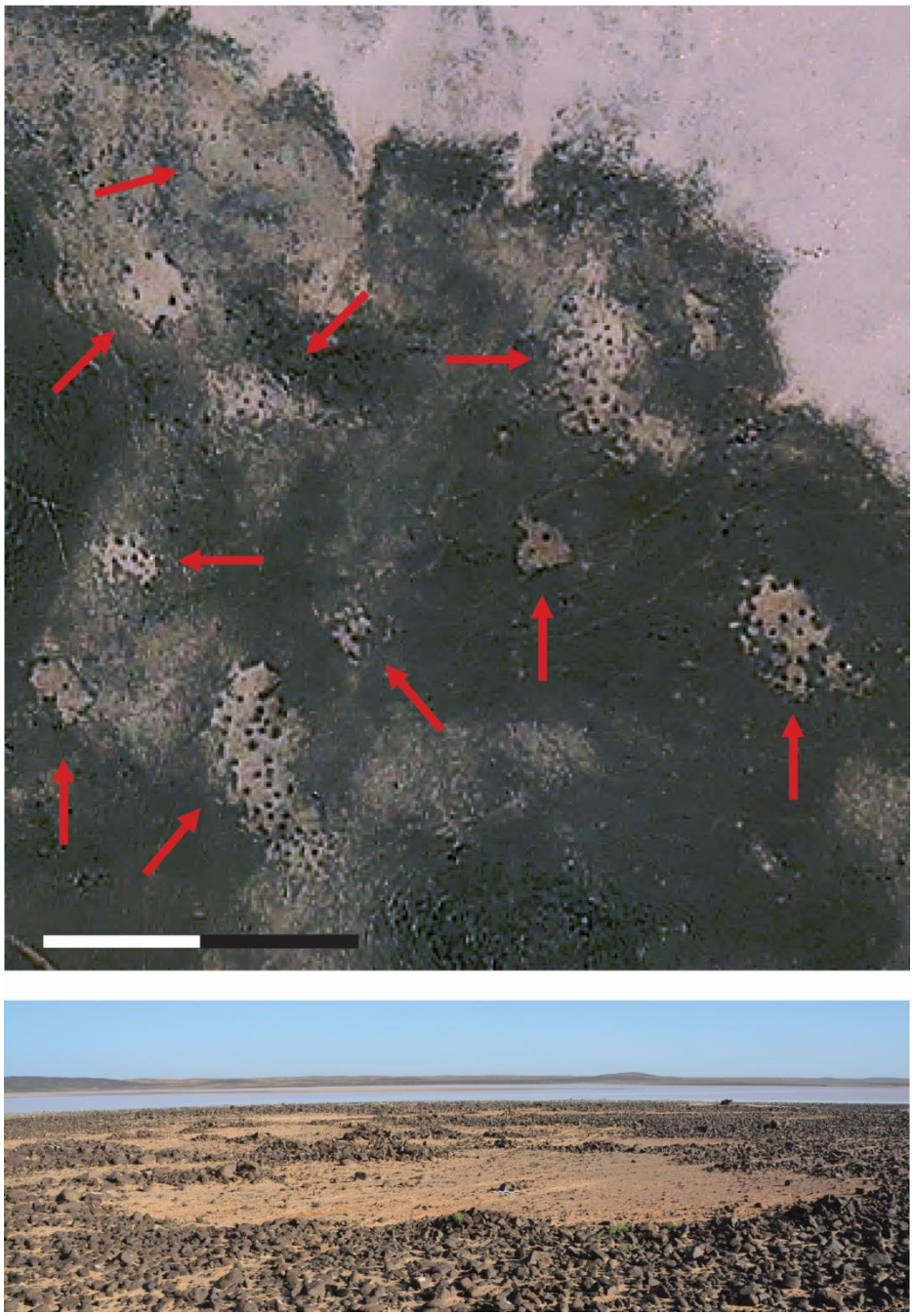


Figure 3.13: Clearings on the edge of a mudflat. Top: clearings indicated by red arrows on Ikonos satellite imagery (scale is 100 m). Bottom: a clearing at QUR-882 (photo by P. Akkermans).

tial units or other installations, as a result of these recent reconfigurations. It should also be noted that many of the clearings identified in the Jebel Qurma remain undated at the moment due to a lack of datable surface remains associated with them.

Cairns

Cairns are mounds of stone that are widely known from the Black Desert and other basalt landscapes of Arabia, where many thousands of cairns have been documented through remote sensing studies (Kennedy 2011; Kennedy & Bishop 2011). Although they are usually interpreted as funerary monuments, very few of them have thus far been studied on the ground. Their interpretation as burial cairns is based partly on Safaitic inscriptions mentioning funerary practices, which have sometimes been found in association with cairns. Excavations have shown that at least a number of cairns associated with funerary inscriptions were indeed tombs (e.g. Clark 1981; Harding 1953; 1978, 245-9). At the same time, however, it has proved dangerous to categorically ascribe a funerary function to cairns. At Maitland's Mesa, for example, cairns that were originally thought to be funerary monuments, because of their similarity in appearance to tombs in the Negev, later proved to be prehistoric

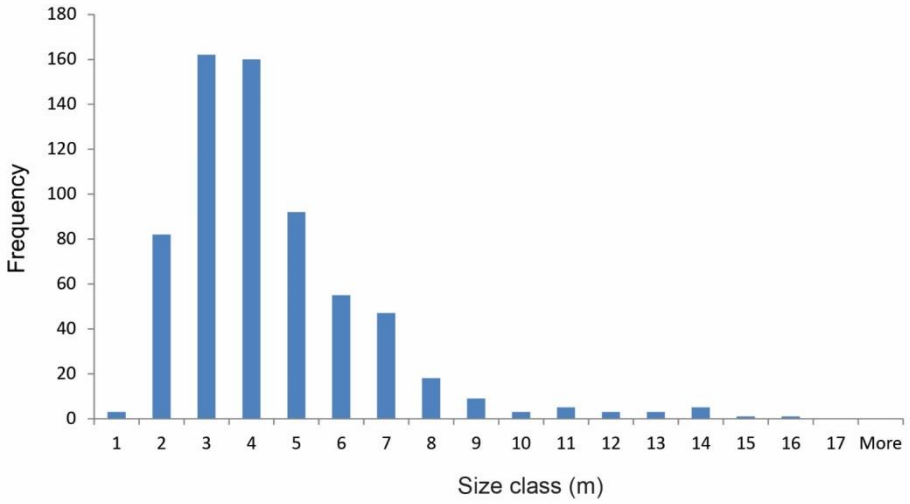


Figure 3.14: Histogram showing the number of cairns documented through pedestrian surveys per size class according to diameter (in meters).

Figure 3.15: Two types of facaded cairns. Left: a small cairn with a relatively low façade (QUR-943). Right: a large Tower Tomb featuring a high, neatly stacked façade (QUR-64). Scale is 50 cm. Photos by P. Akkermans.

dwellings (Rowan et al. 2015). Other excavated cairns yielded no human bone material or potential grave gifts (e.g. Harding 1978, 243), and there was therefore no clear evidence that these were funerary structures. A classification of different cairns in terms of form, chronology and, indeed, function is necessary to better understand these features. It is furthermore important to realise that cairns, similar to other surface features, may have been reused in different periods and for different purposes, as has been shown in other parts of Arabia (e.g. Crassard et al. 2010; Döpper 2015; McCorriston et al. 2011).

In the Jebel Qurma region 671 cairns were documented in total through pedestrian surveys between 2012 and 2016. 38 of these were situated in the *hamad* landscapes, the others were situated in the *harra*. The total size variability of the cairns ranges between 0.8 and 15.6 m. When the variability of the diameter of cairns is plotted in a histogram (Fig. 3.14) any clear differentiation between cairn types based on size does not become apparent, as the variation is distributed more or less normally. To further differentiate between cairn types we may instead turn to their general morphology. While over 95% of the cairns can be characterised simply as crudely piled rock heaps, a limited number of them (31, or 4.6%) showed a more neatly stacked external façade. Most of these façades are fairly low (less than 1.25 m high), although a few seemed to be much higher and created of much larger stones that were neatly aligned (Fig. 3.15). These cairns were also more formidable in diameter, i.e. between ca. 7 and 13 m, than the cairns with lower façades, which were mostly between ca. 2 and 6 m across.[6] Any further differentiation within the large group of cairns that does not feature a façade but simply consists of a dome of rocks is at this point not possible, but requires further study through excavation (see Chapter 5).

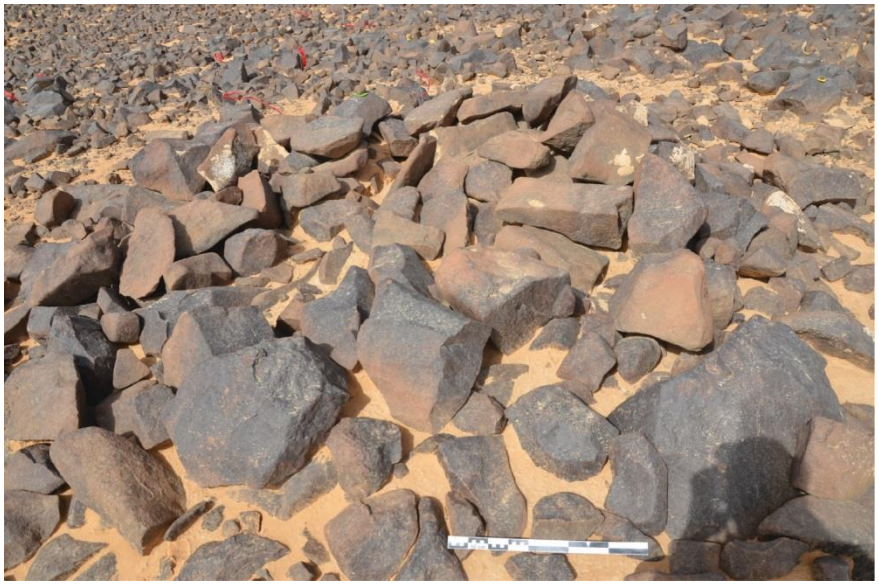


Figure 3.16: Low cairn featuring a circular outline of larger stones in the centre (QUR-529). Scale is 50 cm, photo by P. Akkermans.

Figure 3.17: The top of two cairns featuring a depression in the centre, at QUR-207 (left) and QUR-943 (right). Scale is 50 cm. Photos by P. Akkermans.

Some evidence was collected in terms of the function of cairns. At a total of 163 cairns a possible central chamber was observed. There were several potential indicators for the presence of such a chamber. A circular or oval outline was sometimes visible on top of cairns. These outlines were made of blocks that were often somewhat larger than the stones used for the general cairn construction (Fig.

[6] These measurements do not necessarily reflect the original size of the cairn but may include a 'cover' representing later additions to the cairn or debris (see Chapter 5).

3.16). In other cases a shallow depression was observed, also on the top of the cairn, which presumably had formed due to the collapse or looting of an internal chamber (Fig. 3.17). Actual chambers, including the walls (Fig. 3.18) and sometimes even part of the roof construction (Fig. 3.19) were observed as well. Within a number of these chambers (31 in total) skeletal remains were observed – sometimes clearly human (Fig. 3.20) – suggesting that these chambers indeed represent tombs. Recent illicit looting of such tombs has occurred widely, as 152 (22.7%) of the cairns showed signs of recent looting. In addition to human skeletal remains artefacts such as beads and metal objects – presumably grave gifts – or fragments thereof were sometimes exposed by such activities. Importantly, however, skeletal remains were mostly found at cairns with a rather large size: 78% of the cairns with skeletal remains had a maximum width larger than 4 m. There were only

Figure 3.18: Centre of a cairn at QUR-207 featuring a looted chamber with part of a corbelled wall preserved. Photo by author.

Figure 3.19: Cairn at QUR-27 featuring a partially collapsed/looted roof construction on the top. Scale is 50 cm. Photos by P. Akkermans.

Figure 3.20: Central part of a burial cairn at QUR-148 disturbed by recent looting activities. Photos by P. Akkermans.

four looted cairns at which skeletal remains were observed that were smaller than 4 m across. Therefore, although 60% of the total amount of cairns in the Jebel Qurma region measured less than 4 m in width, it is possible that very few of these actually represent burial structures. Alternatively, it may be that larger cairns are more frequently targeted by looters because of better visibility. Whatever the case, it is difficult to state on the basis of survey evidence alone that the smaller cairns were also used for funerary purposes, and excavations were necessary to further explore their function (see Chapter 5).

Finally, at a total of 56 (8.3%) of the documented cairns a small structure had been created against the side of the cairn, either consisting of a small crescent-shaped or circular enclosure or simply a few protruding walls (Fig. 3.21). These annexes usually occurred on the leeward side of the cairns. Whether these had been original features of the cairns or later additions could not be determined on the basis of survey data alone, and needed to be investigated further through excavations (see Chapter 5).

Figure 3.21: Low cairn at QUR-249 with a small annex in front of it. Scale is 50 cm, photo by P. Akkermans.

Pre-Islamic rock art was regularly present on or directly around cairns. In one case one of these inscriptions referred to constructing or visiting a burial cairn (QUR-215: Della Puppa forthcoming), in which case there is potentially a strong link between the inscriptions and a cairn situated nearby. In other cases, however, there was evidence that a cairn post-dated at least some of the inscriptions associated with it. In these cases stones carrying pre-Islamic carvings were reused for the construction of the cairn. This is evident, for example, where inscriptions were situated within the seams of a façade wall on the cairn's exterior. In these cases these carvings must predate the construction of the cairn, although others might still have been added later.

In summary, this section has shown that cairns of highly variable size and configuration were documented through pedestrian surveys. The survey evidence shows that at least some of them indeed represented tombs, mainly based on materials found in looting debris. Some of them may be relatively young, i.e., postdating Safaitic carvings, but some of them may have been older – prehistoric even. Excavations were required to further investigate morphological, chronological and functional differences between the cairns in the study area (see Chapter 5).

Pendants

Pendants are linear features comprising either a string of small cairns or simply a broad wall of stones, often, but not exclusively, diverging from a larger cairn (Fig. 3.22). The name 'pendant' has its origin in earlier studies of structure types in *harra* landscapes (e.g. Kennedy 2011), but have also been termed *tombes à traîne* (e.g. Steimer-Herbet 2001; 2011) or *tailed cairns* (e.g. Rollefson 2013). Pendants are a rather distinctive type of feature from the basalt landscapes of Arabia. They occur, in various different forms, from the Syrian part of the Black Desert all the way down to Yemen, covering many of the basalt

Figure 3.22: Examples of a pendant as viewed from the air and from the ground. Photos by David Kennedy (left, courtesy of APAAME) and P. Akkermans (right; QUR-32).

regions of the western Arabian peninsula (Kennedy 2011; De Maigret 1999, 329-35). Despite their high number and wide occurrence, their function and date of construction is at this point still largely uncertain. In Yemen, radiocarbon dates from skeletal remains from the main cairns associated with pendants gave a broad date range, i.e. between the early 3rd and early 2nd millennium BC (Steimer-Herbet 2001) and the 1st millennium BC (De Maigret 1999, 331). For the pendants in southern Syria, Steimer-Herbet also argued for a correlation between funerary cairns and pendants, although this association seems to be largely inferred rather than established, as direct dating evidence from this region is currently lacking.

In the Black Desert of Jordan pendants are even less well studied. Even though their occurrence has long been established through aerial reconnaissance (Kennedy 2011, 3189-90; Rees 1929, 391), investigations on the ground are very sparse indeed. Until recently (but see Chapter 5) only at Maitland's Mesa a pendant had been investigated in detail. Here, the individual heaps of the pendant appeared to have been small oval to rectangular chambers that did not appear to contain any human bone or other remains, perhaps suggesting that these are not tombs by themselves but may have served a commemorative function in relation to the main cairn at the head of the pendant (Rowan et al. 2015, 180, following Kennedy 2011, 3190). This conclusion, however, needs to further substantiated as it is based on a single case only and, again, lacks dating evidence (see Chapter 5).

A total of 31 pendants were documented in the Jebel Qurma region through pedestrian surveys between 2012 and 2016. A large degree of variability exists among the pendants in terms of size and

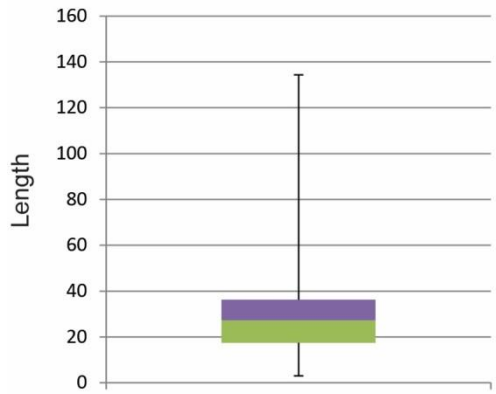


Figure 3.23: Box-and-whisker plot of the length of pendants documented though pedestrian surveys in the Jebel Qurma region.

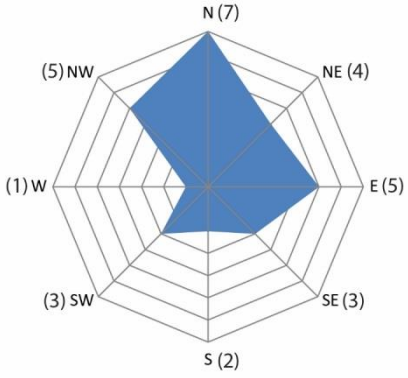


Figure 3.24: Radar chart showing the distribution in orientation of pendants from which they diverge from the main cairn. Absolute amounts are indicated between parentheses (for one of the pendants the orientation is unknown). The *p*-value of the variation is 0.45, indicating that statistically there is no preferred orientation.

configuration. The shortest pendant tail is only about 3 m long and consists of 2 cairns, while the longest pendant tail is 134 m in length and consists of 58 individual cairns (Fig. 3.23).[7] Almost every pendant features a larger cairn at one of its extremities, with one exception, and there does not seem to be a preferred orientation of the tail (Fig. 3.24).

The pendants are difficult to date on the basis of survey data alone. They are usually not associated with pre-Islamic rock art or artefacts. Some of the pendants appear to be overlying prehistoric structures, such as the prehistoric 'wheel' (see below) at QUR-148 (Fig. 3.25). Some of the pendants, however, are connected to cairns that are associated with many pre-Islamic carvings, which may suggest that the pendants are of similar date. However, this remains to be further scrutinized (see Chapter 5).

Figure 3.25: A pendant overlying a prehistoric wheel and enclosure at QUR-147. Aerial photograph by Karen Henderson/Nadja Qaili, courtesy of APAAME.

Desert kites

Desert kites, or simply kites, are among the better-studied feature types of the Black Desert. They typically feature a large star-shaped enclosure with walls diverging from its apex. Although their function has been the topic of some dispute over the last decades, recent excavations at a number of kites all seem to suggest that these are installation constructed for hunting large amounts of game, including gazelle, although secondary use as animal corrals cannot be ruled out (Betts & Burke 2015). Animals would be driven towards

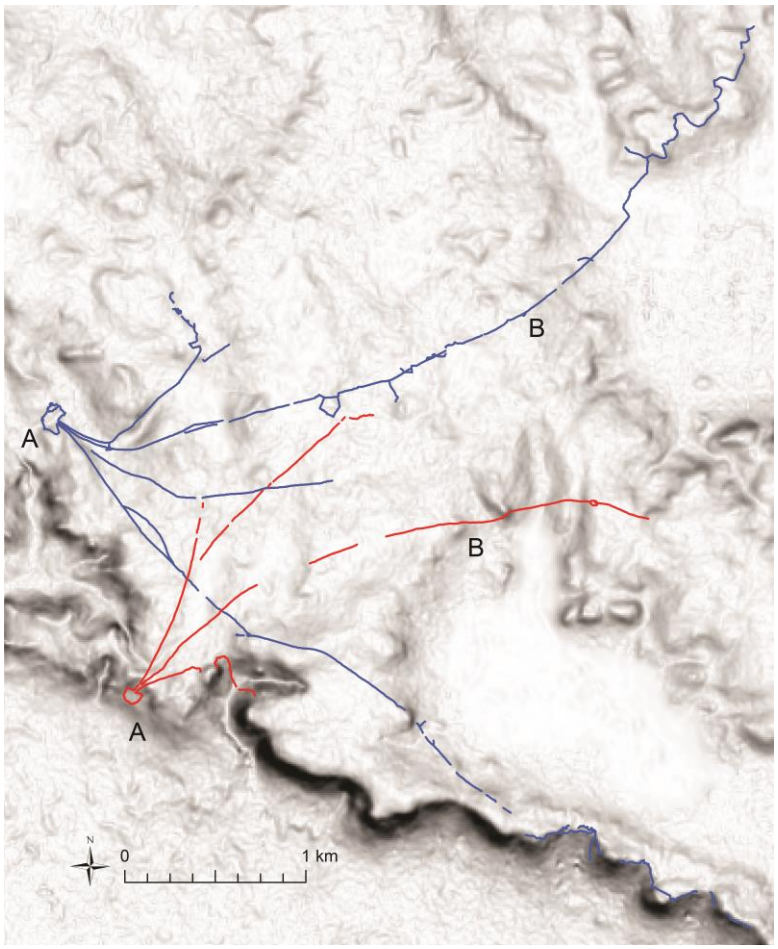


Figure 3.26: Two desert kites in the Jebel Qurma region, featuring an apex (A) and guiding walls (B). Traced from Ikonos satellite imagery. Base image: WorldDEM slope map.

[7] In a box-and-whisker plot the spread of all values in indicated by the end of the whiskers, the median is shown in the middle of the box, and the two halves of the box represent 25% of the values the median and 25% of the values above the median.

the star-shaped enclosure using the diverging arms, where hunters would wait for the animals to kill them. The actual trapping and killing was probably done through the use of pits, situated at the points of the star, where animals would jump into (Abu-Azizeh & Tarawneh 2015). The origin and period of use of kites is less clear than their function. While there is evidence that the original construction date of at least some kites in the Black Desert is prehistoric (Betts & Burke 2015), their use may have continued for much longer. Safaitic rock art is known to depict hunting activities using kites (Macdonald 2005), and there are even ethnographic accounts from the 20th century of similar hunting practices (cf. Fowden 1999). Therefore, while some kites may have a prehistoric origin, it may well be that they were often reused or sometimes even newly constructed in more recent times.

All desert kites that were recognised in the Jebel Qurma region (Table 3.4) were situated in the *harra* landscape. These are very large constructions, featuring traps of hundreds of meters across, and guiding walls diverging from them of up to 5 km long (Fig. 3.26). The trajectory of these walls could be observed and documented with the help of Ikonos satellite imagery. Most of these features, if not all of them, were most likely constructed already in prehistoric times (Akkermans et al. 2014), and there are no clear indications that they were used in younger periods – although it must be stressed that any evidence for the use of these structures, be it as installations for hunting or herding, would be difficult to find on the surface as such activities would leave very little material traces.

Walls

In addition to the linear features described above (enclosures, pendants, kites) a number of walls were recognised that do not seem to fall in these other categories. These were long walls winding through the landscape for many kilometres that did not seem to have a connection to, for example, kites. Ikonos satellite imagery again proved useful in documenting these extensive features, which can be as long as 2 km (Fig. 3.27).

Such walls have been recognised earlier by Kennedy (2011, 3190), who described these features as a form of 'landscape art' in the absence of substantial evidence in terms of function.

Although a number of the long walls in the Jebel Qurma region have been investigated through surface surveys there is at this point no evidence for the date of construction of these features or the way in which they were used in the past.

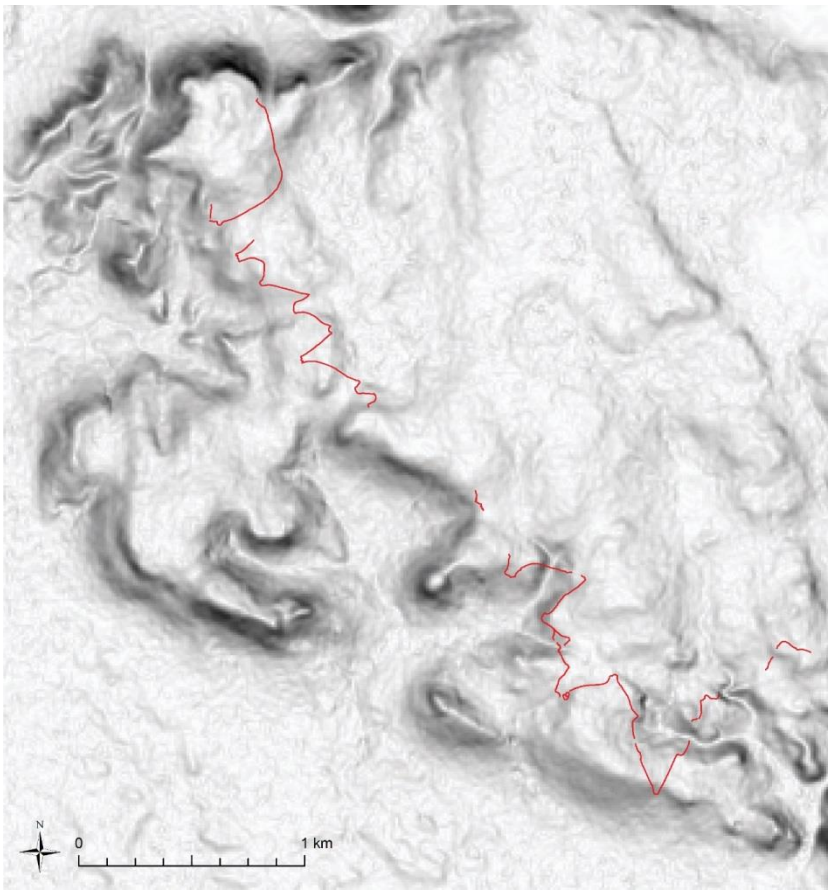


Figure 3.27: Selection of Walls in the Jebel Qurma region traced from Ikonos satellite imagery. Base image: WorldDEM slope map.

Dwelling clusters

In a number of places clusters of small circular to oval or eight-shaped features were recognised. These features had an open interior an can thus be seen as very small enclosures, but are distinctive given their small size and their tendency to form clusters (Fig. 3.28). These were characterised as dwelling clusters because of their close resemblance to other sites in the Black Desert, where excavations showed that these features represent small prehistoric dwellings or hut foundations (Müller-Neuhof 2013, 135; Rollefson et al. 2014; Rowan 2013).

Six dwelling clusters were identified in the Jebel Qurma region and studied through pedestrian surveys. The artefacts picked up at these sites represent mostly prehistoric material, i.e. chipped stone artefacts, which were tentatively dated to a late prehistoric phase of occupation in the Jebel Qurma region (Akkermans et al. 2014). There is no evidence that these structures were reused in more recent times.

Wheels

Wheels are yet another highly distinctive, perhaps unique feature type of the Black Desert. Wheels are defined as roughly circular grouped enclosures surrounded by a ring of hut-like structures (Fig. 3.29).

Although a well-known feature type, again little is known about the function and chronology of wheels. They were first described on the basis of field data by Betts (1982) who used the term 'jellyfish' for them, and she tentatively suggested a domestic function and prehistoric date of origin. Kennedy has challenged this interpretation as he stresses that the circle of small structures around the main enclosure may actually be cairns rather than huts, perhaps suggesting a funerary function rather than a domestic one (Kennedy 2012b). However, with the absence of excavation data their function remains uncertain as of yet. Recent research in the Black Desert, however, has provided more information about their possible date of origin. OSL dates from a number of wheels suggest that they were constructed over a very long time period, i.e. between the early 7th and late 4th millennium BC (Rollefson et al. 2016).

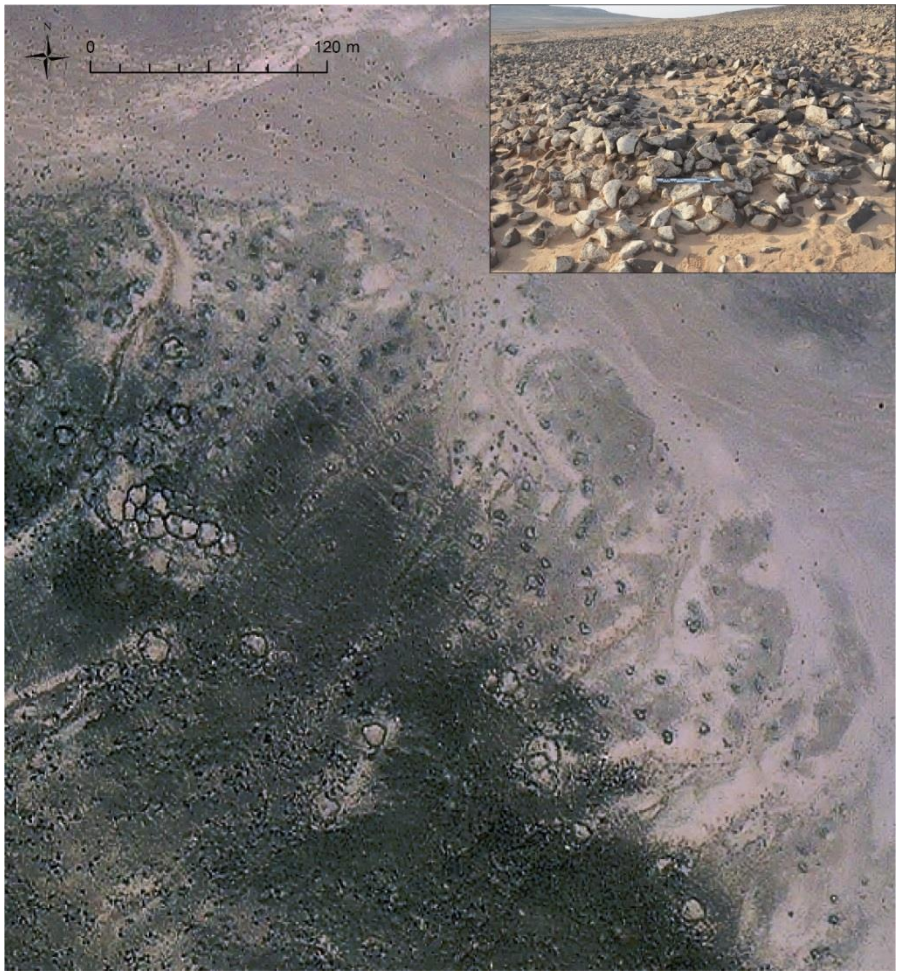


Figure 3.28: Ikonos satellite image of a cluster of dwellings at the site of QUR-6 at the foot of Jebel Qurma. Insert: a dwelling or hut foundation at QUR-6. Photo by P. Akkermans, scale is 50 cm.

In the Jebel Qurma region, numerous wheels have been documented through remote sensing and pedestrian surveys (Table 3.4). Evidence for a prehistoric origin of these features was found at many of these features, in the form of chipped-stone artefacts and, possibly, ceramics (Akkermans et al. 2014). Nevertheless, a number of wheels appear to have been reused and altered during more recent times, thus changing the original configuration of the wheel. Moreover, ceramics from the Classical/Late Antique period were encountered within some of the enclosures of the wheel, which may be indicative of domestic use of the wheels (see above). In other cases cairns surrounded by large amount of pre-Islamic rock art had been constructed in the centre of these wheels.

Figure 3.29: A Wheel in the Jebel Qurma region (QUR-146) as viewed from the air and on the ground. Photos by Mike Neville (left, courtesy of APAAME) and P. Akkermans (right).

Tent places

A large number of features were interpreted as abandoned tent places. These are rectilinear clearings often outlined by small heaps of stone or gravel, which probably served to keep down tent cloth (Fig. 3.30). Their rectangular shape is similar to the traditional black tent of the Bedouin (cf. Cribb 1991, 140), and their use as residential areas is further substantiated by the occurrence of fireplaces within some of these features and modern trash within and around them. A large number of tent places were documented (Table 3.4).

The interpretation of these outlines as tent places is further substantiated by similarities to oth-

Figure 3.30: Examples of tent outlines. Left: rectangular tent outlines in Wadi Rajil as visible on Ikonos satellite imagery. Right: a tent outline in at HAZ-9 in the Hazimah plains. Photo by author.

er remote sensing and field studies of abandoned Bedouin campsites (e.g. Banning 1993; Saidel & Erickson-Gini 2014; Tucker 2009). These studies further indicate that such tent places probably date mostly between the 17th and 20th centuries AD, although there is limited archaeological evidence that suggests the black tent was used already much earlier, i.e. from the 6th-8th century AD onwards (Saidel 2008, 473).

The field surveys in the Jebel Qurma region thus far do not provide any evidence for the use of such tent places during the Classical or Late Antique period. Although in eleven cases ceramics from this period were found on such tent places or directly around them, it is possible that these artefacts are chronologically associated to the clearings on which these tent places were situated rather than with the tent places, which may have been added much later. Excavations are required to further establish whether the rectangular tent places may represent remains from antiquity.

Graves

In addition to burial cairns there were a total of 133 features that were tentatively identified during the pedestrian surveys as more simple graves. Some of these potential graves were found in isolation while others were found in clusters of up to 10 graves (Fig. 3.31). In some cases these were elongated stone heaps with an east-west orientation reminiscent of the covers of Islamic inhumation graves. Some of these had a 'headstone', for example in the form of an upright slab at one end, which makes their identification as a grave more likely.

Figure 3.31: Example of an Islamic grave from the site of QUR-1028. Scale is 50 cm. Photo by P. Akkermans.

A different type of potential graves was recognized in the Hazimah plains – site HAZ-27 – where the graves consisted of circular outlines of limestone or sandstone blocks. These graves were found in a string, reminiscent of a pendant (cf. Huigens 2015), but in this case they were associated with a number of artefacts that were exposed through looting. From one of the disturbed features came large amounts

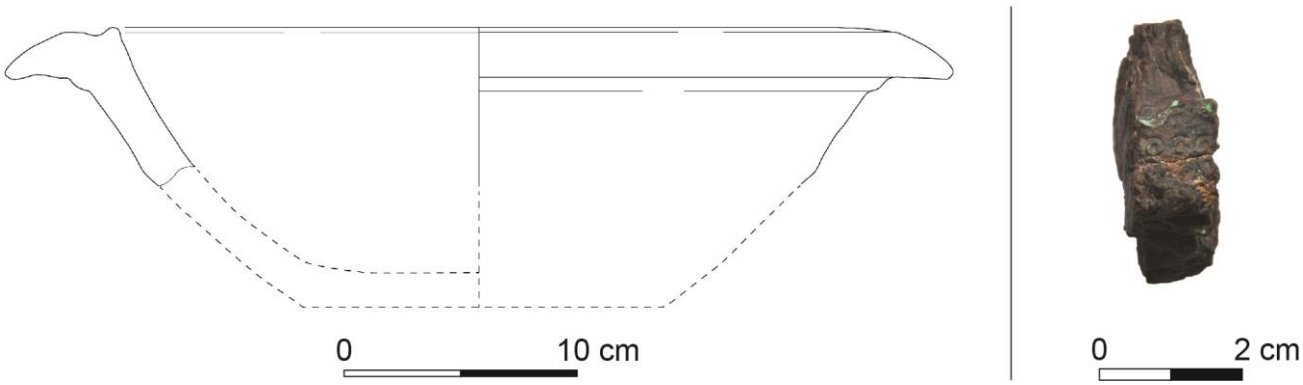


Figure 3.32: Selected artefacts from the cemetery at HAZ-27: a 3rd/4th century AD mortarium (left; see § 3.6. for details) and a fragment of an iron object with decorated bronze cladding (right).

of bronze and iron fragments as well as the remains of a large ceramic vessel dating to the early 4th century AD (Fig. 3.32). This would suggest that at least some of the inhumation graves may be of pre-Islamic origin. To further investigate this a similar kind of small 'cemetery' that was recognized during surveys at the site of QUR-829 was further investigated through excavations (see Chapter 5).

Desert mosques

Desert mosques are small religious structures featuring, at the very least, a small prayer niche or *mihrab* orientated towards Mecca. Additionally a wall or even a chamber may be attached to the *mihrab* enclosing the area in which people gathered for prayer (Fig. 3.33). 21 desert mosques were recognized in the Jebel Qurma region.

Figure 3.33: Example of a desert mosque at QUR-999, with the *mihrab* indicated. Scale is 50 cm. Photo by P. Akkermans.

Desert mosques – also called 'open-air mosques' (Avni 2007) – are well known from ethnographic and archaeological studies, including in the Black Desert, and may be associated with nomadic campsites or small agricultural settlements (Avni 1994; Carvajal Lopez et al. 2015; Betts et al. 2013) or burial grounds (Lancaster & Lancaster 1999, 252). For some of the desert mosques recorded in the Negev it was suggested that they may date already to the Early Islamic period (Avni 1994), although this is based on survey evidence alone and not corroborated by absolute dating methods.

Whether desert mosques occur this early in the Jebel Qurma region is difficult to say, as they are not usually directly associated with datable materials. In some cases Mamluk-period inscriptions were found carved on the walls of these mosques (Akkermans & Huigens in press). Although desert mosques are attested at a number of sites where Early Islamic ceramics were found, in most cases these sites were also frequented in more recent times, which makes it difficult to date the mosques through spatial association. More direct evidence for Early Islamic use of these features in the Jebel Qurma region is not available at this point either.

Markers

Markers are conical stone pilings characterised by some visual prominence (Fig. 3.34). This is usually achieved by their shape but sometimes also by their location. Some markers, for example, are constructed on top of cairns, or at other prominent locations. A few markers had received a white coating, no doubt in relatively recent times. The Jebel Qurma region hosts a large number of these markers, as 342 of them were documented through pedestrian surveys. They are usually rather limited in width and therefore poorly identifiable through remote sensing. A large degree of variation exists in their morphology and size. Although most of the markers are not taller than about 65 cm and crudely constructed, some of them are much higher, i.e. up to 1.65 m, and more neatly built. Their visual prominence suggests that they may have been raised to mark a particular place or trajectory.

In this respect, various authors have suggested that such features may have functioned as route markers (Polkowski 2015; Riemer 2013; Rossi & Ikram 2013), given their association with archaeologi-

cally or historically known routes. Other possibilities would be that they were used to mark territories or simply to mark points of interest, such as favourable campsites or lookout spots.

The lack of associated datable remains greatly hampers establishing the date of construction of markers. There is little evidence that markers in the Jebel Qurma region were constructed already in antiquity. Although some of the markers are spatially associated with pre-Islamic rock art, this association hardly provides evidence that the rock art and features are contemporaneous.

Figure 3.34: Examples of markers in the Jebel Qurma region. Scales are 40 cm (left) and 50 cm (right). Photos by author (left) and P. Akkermans (right).

Other/undefined

In addition to the better defined features types described above, a large variety of small and rather enigmatic features has been documented during the pedestrian survey. These include small circular hut-like features and crescent-shaped walls, mostly between about 2.3 and 4.2 m wide and up to 1.35 m high, which perhaps represent small temporary shelters or wind shields (Fig. 3.35), although this interpretation remains tentative. In some cases these features are associated – at least spatially – with pre-Islamic rock carvings. It is difficult, however, to establish a clear chronological relation between the carvings and these features (see § 3.5.3. for a more elaborate discussion). An example is provided at the site of QUR-741 which features one structure only – a small shelter-like feature (Fig. 3.35) – and associated with it two Safaitic inscriptions but also a recent Arabic inscription. Whether the structure is contemporaneous with the inscriptions and, if so, whether it is related to the Safaitic texts or modern Arabic inscription is impossible to say.

Figure 3.35: Examples of small hut-like shelters, at QUR-737 (top) and QUR-741 (bottom). Scales are 50 cm. Photos by P. Akkermans.

Also included here are features which, although clearly anthropogenic, were even less substantial, including small rock pilings, bin-like installations, small platforms, and so on. All of these features are difficult to date given the lack of datable remains that could be unequivocally associated with these features.

Paths

The final feature type identified in the Jebel Qurma region are paths (Fig. 3.36). Numerous paths appear to run through the region, especially in the *harra* landscapes. These features were first identified on satellite imagery, and subsequently investigated on the ground (Huigens 2018). The occurrence of paths in the basalt regions of the Black Desert was described already by European travellers of the late 19th and early 20th century, such as Von Oppenheim (1899, 219) and Bell ([1907]1919, 115-6). Thus far however, these paths had not been identified in archaeological remote sensing or field surveys.

Figure 3.36: Example of a path winding through the *harra* landscape. Photo by P. Akkermans.

On Ikonos imagery, paths appear as lightly coloured linear traces that run through the dark basalt surface cover. These features appear on the imagery as narrow lines, often diverging from- and converging to each other (Fig. 3.37). They are normally not wider than c. 1.5 m, and may run parallel to the

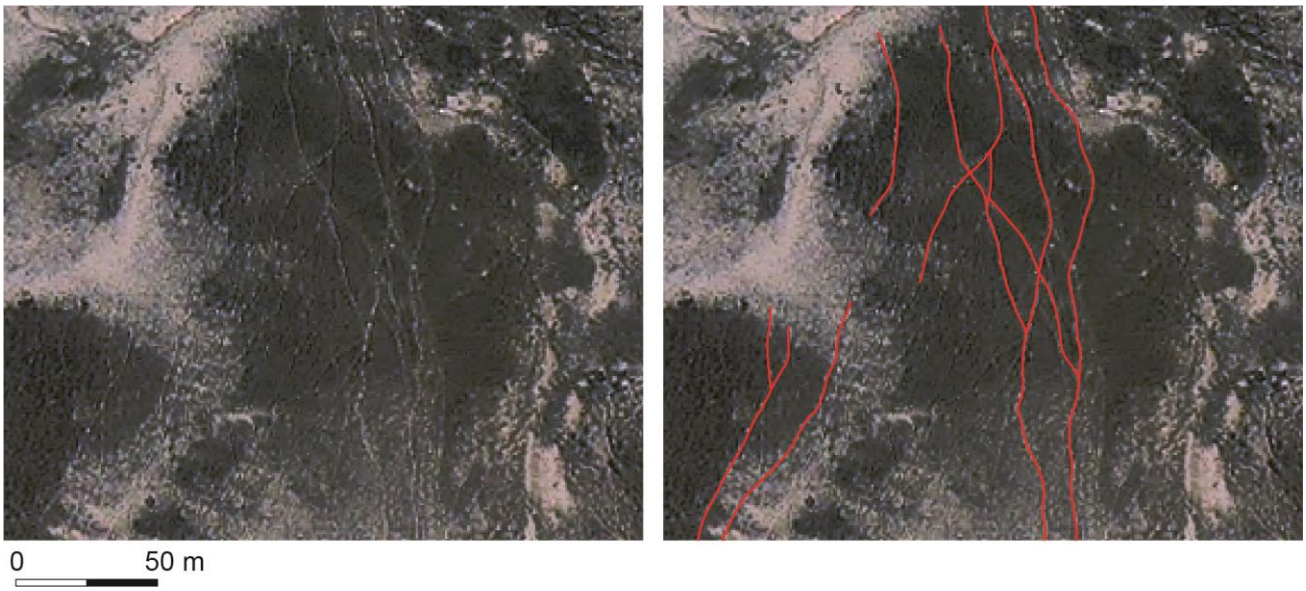


Figure 3.37: Left: Unmodified Ikonos imagery showing paths running through the *harra* landscape. Right: Paths traced on the imagery.

contour lines of the terrain or perpendicular to it. They are mostly somewhat curved and in a few cases, especially when running up a steep slope, they follow a zigzag pattern — thereby forming a switchback path. Hundreds of such paths were traced from Ikonos satellite imagery (Fig. 3.38).

The paths recognised on satellite imagery and during pedestrian surveys in the Jebel Qurma region are relatively simple. There are no cases in which, for example, paths were paved or steps were created in paths leading up steep slopes. Rather than being built intentionally, it seems more likely that most of the paths are the result of prolonged trafficking through the landscape by both animals and people who occasionally kicked aside stones in their way. In time, this process resulted in the formation of paths, through which the accessibility of the landscape was greatly improved. There is little direct evidence for the deliberate creation of paths, although it is not implausible that people sometimes intentionally made effort to increase their accessibility by removing rocks.

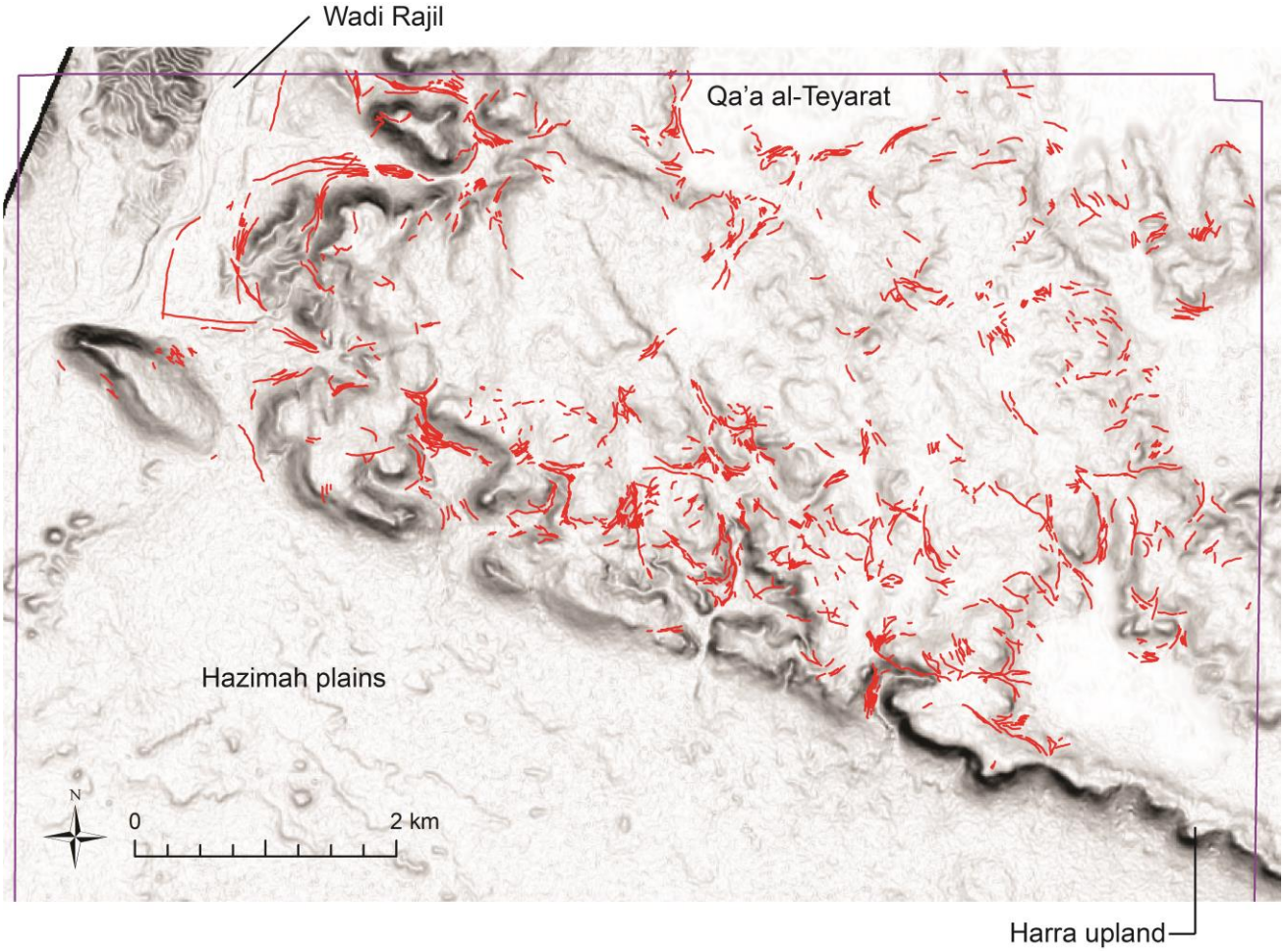


Figure 3.38: Distribution of paths in the *harra* landscape of the Jebel Qurma region. Ikonos imagery extent is indicated in purple lines. Base image: WorldDEM slope map.

Evidently, the paths themselves are difficult to date. Nevertheless, in a few instances datable remains such as ceramics and rock art were found in direct association with paths. An example from pre-Islamic times is the occurrence of a Safaitic inscription, mentioning pastoral activities, that was carved on a stone situated directly next to a path in an otherwise isolated area (Fig. 3.39). It may thus be inferred that at least some of the paths in the Jebel Qurma region were probably traversed already in antiquity, and they may be further analysed to investigate patterns of movement through the *harra* landscapes (see Chapter 4).

3.4.5. Discussion

Figure 3.39: Path in the *harra* landscape with an isolated Safaitic inscription found directly along it. The inscription mentions pastoral activities (QUR 749.1.1; see Della Puppa forthcoming).

Numerous types of stone-built features have been documented through surface surveys in the Jebel Qurma region. On the basis of datable surface remains, mainly artefacts and rock art, as well as through comparison with the results of other archaeological field projects, it has become clear that many of these features were constructed, used, and re-used during various different periods, from prehistory up to relatively recent times. Features that were used or frequented between the Hellenistic and Early Islamic periods were identified mainly on the basis of ceramics and pre-Islamic inscriptions and petroglyphs, and include the following feature types. Classical and Late Antique ceramics were often encountered in close association with clearings and enclosures – including some of the wheels – and in a few cases Safaitic inscriptions explicitly mentioning an enclosure were found on or near such a structure. The occurrence of ceramics at these features may indicate that enclosures and clearings were part residential areas, in which the ceramics represent waste associated with domestic activities. This is further investigated in Chapter 4. Furthermore, pre-Islamic inscriptions and petroglyphs were often found in association with non-domestic structures, most notably cairns. The exact nature of this association remains to be investigated as well. An important question in this respect is whether these inscriptions are related to any potential burial practices at these locations or not. This is further investigated in Chapter 5. Less elaborate funerary monuments, i.e. simple inhumation graves, were also shown to have been used in pre-Islamic times through an occasional association with Roman-period ceramics, although the extent of this practice remains unclear. Pendants have often been found in association with potential funerary cairns, but the lack of datable surface remains associated with pendants makes it impossible to say when they were constructed without excavating them (but see Chapter 5). Other structure types that were also possibly used, or perhaps even constructed, during the period of study are desert mosques and small, simple structures such as stone-built shelters and markers, but this remains a tentative sug-

gestion. Finally, there is limited evidence that the many paths that run through the *harra* landscape were traversed already during Classical Antiquity, based on their association with Safaitic carvings.

3.5. SITE TYPES OF THE CLASSICAL AND LATE ANTIQUE PERIODS

In the above sections the archaeological and epigraphic remains that have been documented through pedestrian surveys in the Jebel Qurma region have been presented, in terms of the available dating evidence and the types of features possibly associated with this material. The sites that have been documented in the study area, however, are not equally constituted. Rather, there appear to be different types of sites comprising different features, artefacts, and rock art. In this section an attempt is made to classify the sites on this basis.

3.5.1. Residential sites

Residential sites can be defined as locations in the landscape where inhabitants of the region resided, be it for a short or prolonged period of time. At such locations different kinds of domestic activities could be carried out, including general housing in residential units such as tents, huts, or other kinds of architecture, and the preparation of food. As outlined in Chapter 1, the material traces from such activities at residential sites may include the remains or outlines of dwellings, waste material from domestic activities such as ceramics, animal bones, plant remains, and other trash, as well as fire places used for cooking or craft activities.

The first and most accurately datable surface remains that may serve to indicate residential sites in the Jebel Qurma region are ceramic scatters found in association with specific types of architectural features. Most of the ceramics that could be dated between the Hellenistic and Early Islamic periods were found in association with sites featuring enclosures and clearings, i.e. extensive areas that were cleared of the original surface cover to create a smooth area suitable for the erection of tents or huts. The ceramics that occurred at these sites are probably best interpreted as domestic waste associated with domestic activities.

Site	Dating criteria	Period	With enclosure(s)?	Prehistoric remains?	Modern reuse?	Potential camping area (m2)
HAZ-1	Ceramics	Byzantine/Early Islamic			x	?
HAZ-15	Ceramics	Roman			x	?
HAZ-21	Ceramics	Byzantine/Umayyad			x	?
HAZ-23	Ceramics	Late Byzantine/Early Islamic			x	?
HAZ-44	Ceramics	Hellenistic/Roman or Byzantine/Early Islamic	x	x	x	?
HAZ-TA88	Ceramics	Late Byzantine				?
HAZ-TB70	Ceramics	Abbasid				?
HAZ-TD2	Ceramics	Roman/Byzantine/Early Islamic				?
HAZ-TD72	Ceramics	Late Hellenistic		x	x	?
QUR-1	Ceramics	Abbasid	x	x	x	17000

Table 3.5: Classical/Late Antique campsites documented in the Jebel Qurma region.

Site	Dating criteria	Period	With enclosure(s)?	Prehistoric remains?	Modern reuse?	Potential camping area (m2)
QUR-1016	Inscription; ceramics	Hellenistic/Roman, possibly also Byzantine/Early Islamic	x		x	4100
QUR-1022	Ceramics	Umayyad	x		x	6400
QUR-11	Ceramics; C14	Early Islamic	x	x		800
QUR-123	Ceramics	Late Byzantine/Umayyad	x	x		3050
QUR-140	Ceramics	Byzantine/Early Islamic	x	x	x	360
QUR-146	Ceramics	Late Byzantine/Early Islamic	x	x		4600
QUR-162	Ceramics	Early Roman & Late Byzantine/Early Islamic	x	x	x	4000
QUR-175	Ceramics	Hellenistic/Roman, possibly also Byzantine/Early Islamic	x	x	x	1750
QUR-185	Ceramics	Umayyad	x	x		3300
QUR-20	Inscriptions	Hellenistic/Roman	x	x	x	1600
QUR-206	Inscription	Hellenistic/Roman	x	x	x	2900
QUR-210	Inscription; ceramics	Hellenistic/Roman & Umayyad	x	x	x	1600
QUR-22	Ceramics	Late Byzantine/Early Islamic			x	8200
QUR-23	Ceramics	Umayyad	x	x		600
QUR-257	Ceramics	Hellenistic	x		x	5700
QUR-295	Ceramics	Hellenistic/Early Roman			x	850
QUR-337	Ceramics	Early/Late Islamic	x		x	2600
QUR-347	Ceramics	Byzantine/Early Islamic			x	27000
QUR-360	Ceramics	Byzantine	x		x	21000
QUR-370	Ceramics	Early Byzantine & Umayyad	x		x	1100
QUR-373	Ceramics; C14	Roman, Byzantine & Early Islamic	x	x	x	2400
QUR-389	Ceramics	Late Byzantine/Early Islamic			x	1700
QUR-393	Ceramics	Late Byzantine			x	3500
QUR-396	Ceramics	Byzantine/Early Islamic			x	1000
QUR-446	Ceramics	Byzantine				1000
QUR-490	Ceramics	Roman			x	2350
QUR-595	Ceramics; C14	Hellenistic, Roman and Byzantine/Early Islamic	x	x	x	3400
QUR-6	Ceramics	Abassid, possibly also Hellenistic/Roman	x	x	x	34400
QUR-615	Ceramics	Late Byzantine			x	4600
QUR-619	Ceramics	Byzantine/Early Islamic	x		x	7000
QUR-632	Ceramics	Iron Age II/Hellenistic			x	2050
QUR-637	Ceramics	Late Roman/Byzantine			x	2100
QUR-645	Ceramics	Late Byzantine/Early Islamic			x	3200
QUR-651	Ceramics	Fatimid			x	2000

Table 3.5 (continued)

Site	Dating criteria	Period	With enclo-sure(s)?	Prehisto-ric remains?	Modern reuse?	Potential camping area (m2)
QUR-653	Ceramics	Roman			x	3900
QUR-661	Ceramics	Late Byzantine/Early Islamic	x			750
QUR-734	Inscription	Hellenistic/Roman	x	x	x	600
QUR-735	Ceramics	Late Byzantine		x	x	6700
QUR-759	Ceramics	Roman			x	2500
QUR-768	Ceramics	Late Roman/Byzantine				160
QUR-773	Ceramics	Late Roman/Byzantine				1200
QUR-785	Ceramics	Abassid			x	1750
QUR-787	Ceramics	Late Roman			x	3800
QUR-833	Ceramics	Byzantine				5400
QUR-851	Ceramics	Roman/Early Byzantine				300
QUR-974	Inscription	Hellenistic/Roman	x	x		1100

Table 3.5 (continued)

Some of the Safaitic inscriptions are further indicative of the presence of residential sites in the study area. A limited number of the inscriptions from the Jebel Qurma region refer to enclosures, and most of these were indeed found at sites where one or more of such structures were present.

These criteria, the presence of ceramics or inscriptions referring to the use of enclosure, were used to define a number of residential sites in the Jebel Qurma region. The same materials were used to provide an indication for the period(s) during which these sites were inhabited. In cases where the inscriptions were used to identify these sites, they were dated to the Hellenistic/Roman period, based on the conventional date range of the Safaitic script. In cases where ceramics were encountered at residential sites the dating evidence as presented above was consulted. The dating evidence obtained from the three residential sites that were excavated (Chapter 4) are included here as well. In total, then, 56 residential sites dating between the Hellenistic and Early Islamic periods could be identified on this basis (Table 3.5). This may seem like a low number and it probably is: a large number of clearings documented through pedestrian surveys in the Jebel Qurma region are difficult to date given the scarcity of find materials on them (see § 3.4.4.). It should therefore be kept in mind that it is possibly that the number of residential sites with which Classical/Late Antique remains could be associated may not represent the total amount of residential sites that was inhabited during this period.

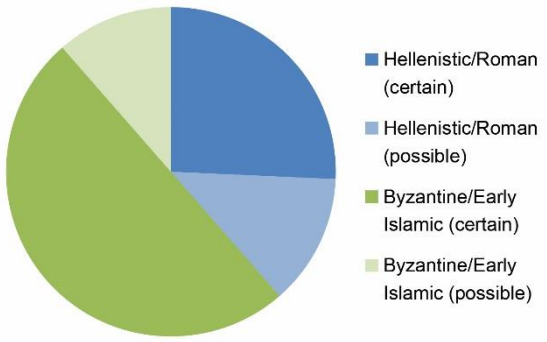


Figure 3.40: Proportion of campsites per period attested in the Jebel Qurma region.

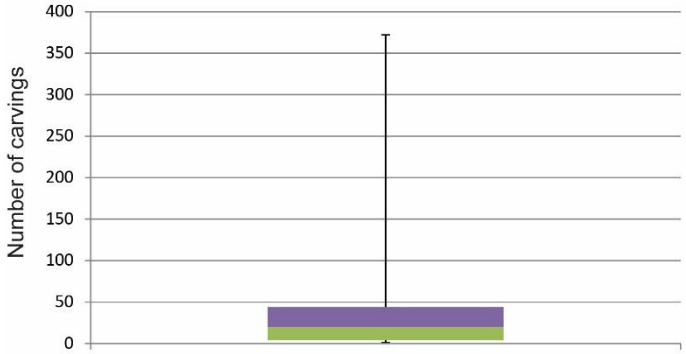


Figure 3.41: Box-and-whisker plot of the number of individual inscriptions and petroglyphs per Classical/Late Antique residential site.

Some of the residential sites have dating evidence from a restricted time period while others seem to have been used during multiple occasions over a prolonged period of time. For example, there are many sites where, in addition to Classical/Late antique ceramics, chipped-stone artefacts are present indicating a prehistoric use phase. At other sites there is evidence of modern reuse of the site indicated by the presence of modern trash, tent remains, and the like.

For analytical purposes the sites can be categorised into two broad periods of inhabitation. These are the Hellenistic/Roman period and the Byzantine/Early Islamic period (Fig. 3.40). Materials

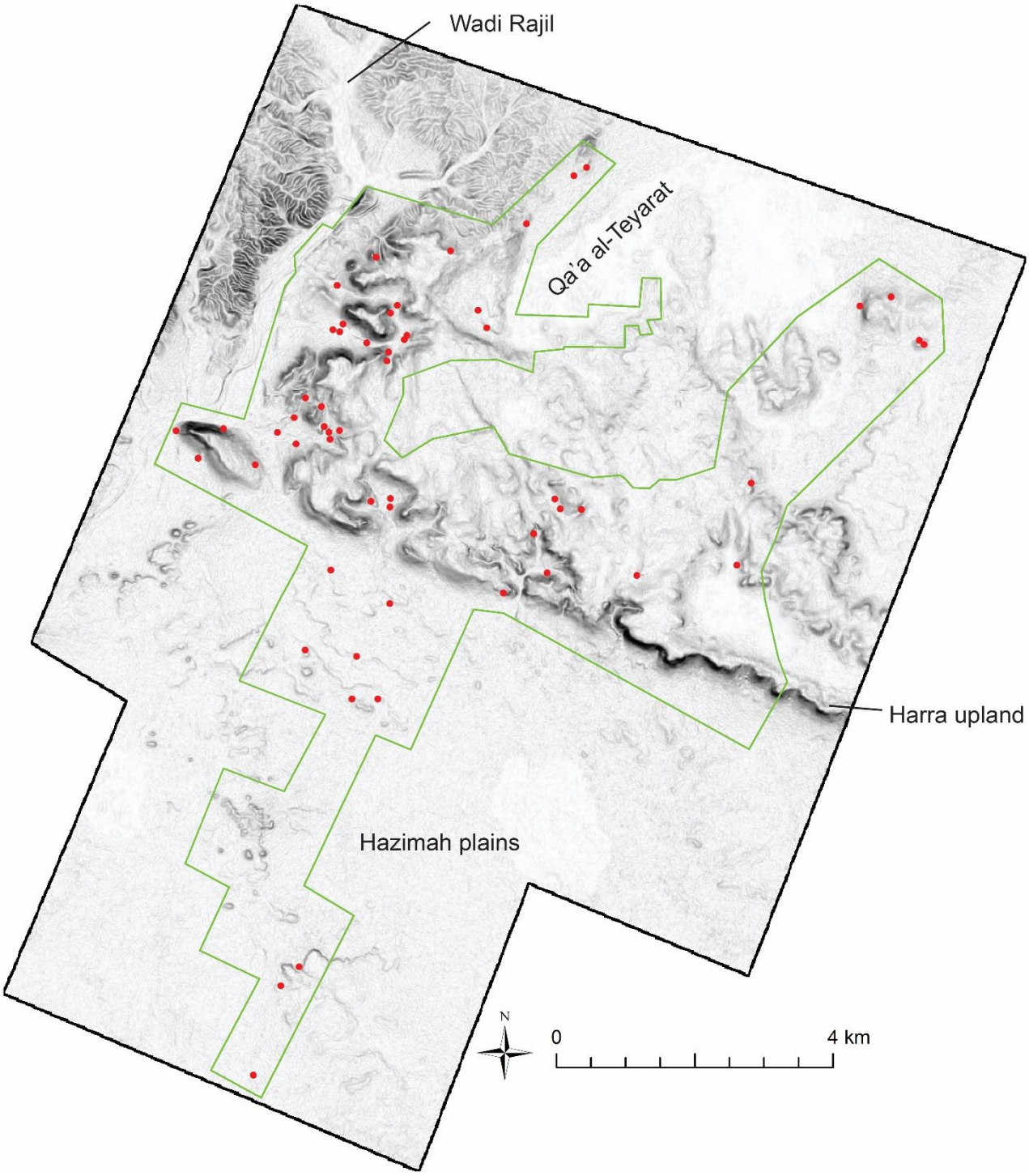


Figure 3.42: Distribution of Classical/Late Antique residential sites (red) in the Jebel Qurma region based on pedestrian surveys. The survey area is indicated in green. Base image: WorldDEM slope map.

from the Hellenistic/Roman period – ceramics and inscriptions – were attested at 18 residential sites (Table 3.5), and another 9 sites may have had ceramics from this period as well, although this is less certain. A total of 35 residential sites could be ascribed with certainty to the subsequent Byzantine/Early Islamic period on the basis of ceramics, and possible at another 8 sites for which the dating evidence was less certain.

These residential sites are invariably constituted of open spaces – mostly of anthropogenic nature, i.e. clearings and enclosures – which may have been used for a number of purposes, including to erect tents or huts, or to pen herd animals. Some of these surfaces were more extensively cleared than others, and in some cases small features were present including platforms, fire places, and even tent places. A word of caution, however, is required here, as many of such features, and even part of the clearings and enclosures themselves, need not always be related to the ancient artefacts and inscriptions present at these sites. At most of the residential sites (73%) there was evidence for recent reuse by Bedouin families, who may have considerably altered the configuration of the ancient sites, for example by modifying or expanding the enclosures and clearings and by adding features. It is therefore difficult to assess the original configuration of the residential sites, i.e., what they looked like when they were inhabited in antiquity.

The number of pre-Islamic inscriptions and petroglyphs at residential sites is usually limited. Less than 40% of the residential sites contained such carvings, and when rock art occurred the numbers of inscriptions and figures was usually low, i.e. less than 50 with only a few exceptions (Fig. 3.41). These are much lower numbers than the amount of carvings found at, for example, funerary sites (see below).

Residential sites usually occur on low-lying areas, such as on floors of valleys that run down from the central plateau of the Jebel Qurma range, and in the open plains beyond (Fig. 3.42). These areas are fairly easily accessible and the basalt surface cover is often relatively open, or even non-existent, requiring limited clearing activities for the creation of areas suitable for residential purposes.

Residential sites represent a small yet distinctive category of the sites that were tentatively ascribed a Classical/Late Antique date. A more detailed description and analysis of these sites is presented in Chapter 4 as this will also be based on the results of excavations discussed in that chapter.

3.5.2. Funerary sites

In addition to residential features and sites the Jebel Qurma region is home to a large number of features that were tentatively designated as funerary monuments. This feature category firstly includes cairns, for which the survey evidence indicates that at least some of them were constructed or reused during the Classical and Late Antique period on the basis of materials retrieved from looter's debris and Safaitic inscriptions referring to burial cairns. Secondly, pendants often seem to be associated with burial cairns and may therefore also have served a function in funerary customs. Finally, a large number of graves were also identified during the pedestrian survey, and there is evidence that at least some of them date back to 1st millennium AD.

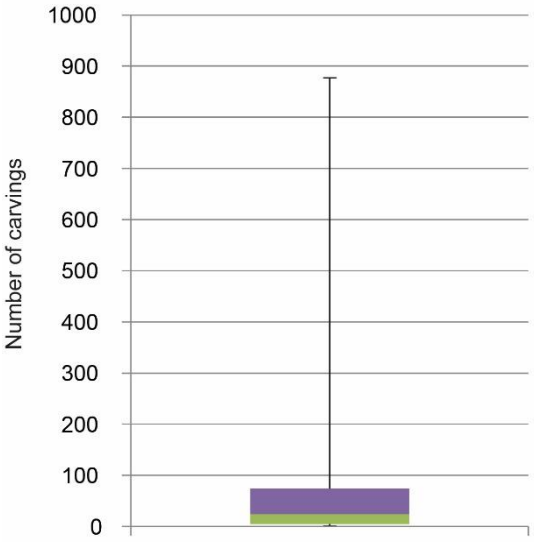


Figure 3.43: Box-and-whisker plot of the number of individual inscriptions and petroglyphs per Classical/Late Antique funerary site.

Dating these funerary monuments on the basis of surface evidence alone is difficult. In contrast to residential sites, these features are not usually clearly associated with datable surface remains. This was only

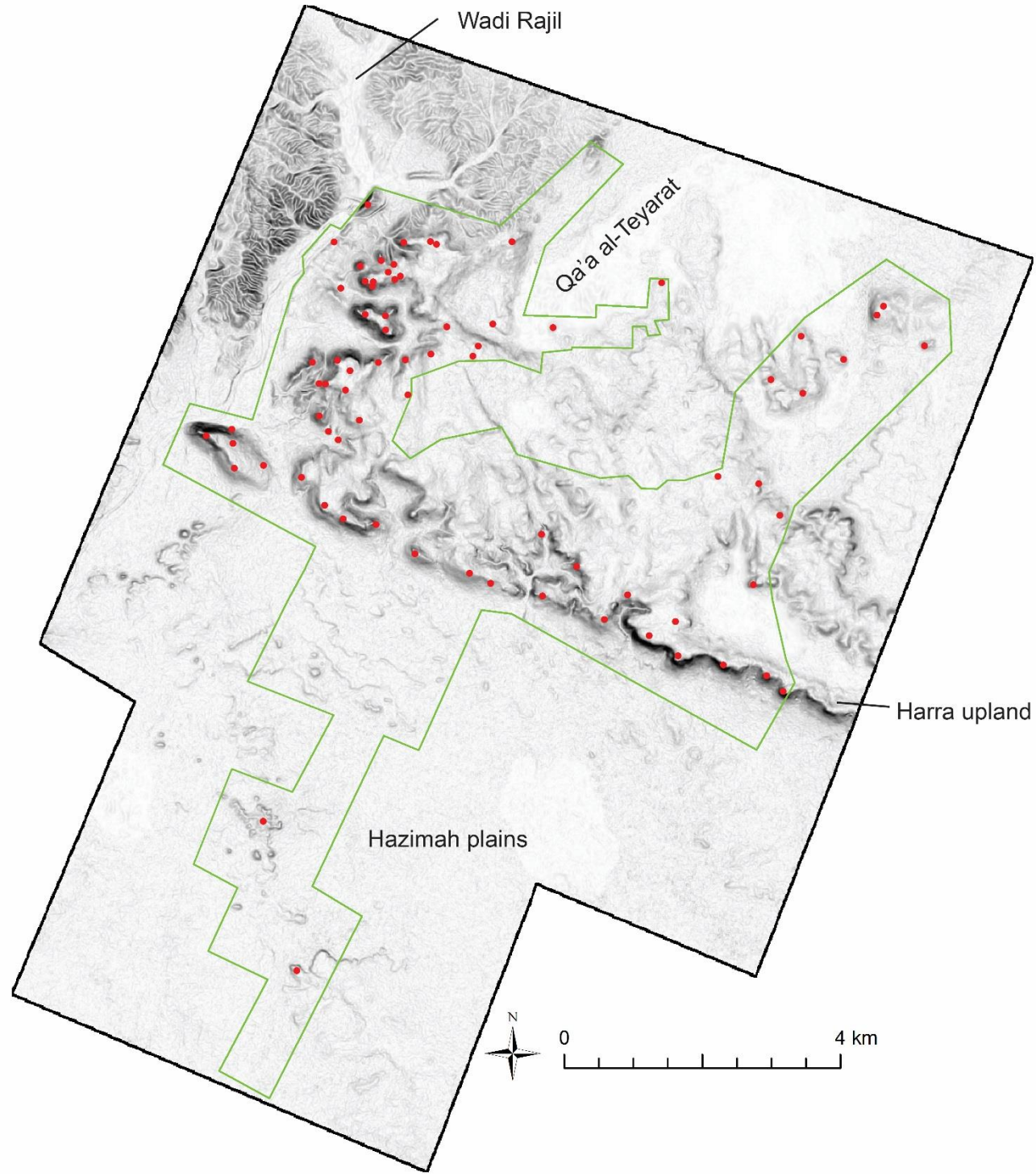


Figure 3.44: Distribution of Classical/Late Antique funerary sites (red) in the Jebel Qurma region based on pedestrian surveys. The survey area is indicated in green. Base image: WorldDEM slope map.

the case when materials could be retrieved from recent disturbances such as looting, or when Safaitic inscriptions and rock art was incorporated in the structure. It was necessary, therefore, to obtain further dating evidence through excavations (see Chapter 5).

On the other hand, we may propose a number of sites for which there is substantial evidence for the presence of funerary monuments as well as datable surface remains – mainly pre-Islamic carvings – that are potentially associated with these tombs. The following criteria were used to define a number of potential Classical/Late Antique funerary sites in the Jebel Qurma region. This was done firstly on the basis of datable surface remains present at these sites, mostly pre-Islamic inscriptions and petroglyphs,

as well as materials retrieved from looter's debris such as ceramics. The second criterion was the presence of potential funerary structures. As noted above, most evidence for the use of cairns as tombs came from cairns with a diameter exceeding 4 m. It is at this point (but see also Chapter 5) questionable that cairns smaller than this size represent burial cairns. Pendants were also included in the selection as there is limited evidence from other regions that they date to the 1st millennium BC.

Following these criteria a total of 75 funerary sites were defined that potentially contained one or more Classical/Late Antique funerary monuments. Only five of these were also defined as residential sites as they also consisted of enclosures and associated ceramics – the rest primarily consisted of funerary monuments. Funerary sites thus mostly represent a site category that is largely separate from residential sites. They further differ from residential sites in the number of pre-Islamic inscriptions and petroglyphs, which are much higher at funerary sites (Fig. 3.43). Furthermore, funerary sites occur at relatively high places in the landscapes, such as hilltops and ridges. They follow a distribution (Fig. 3.44) that is distinct from the distribution of residential sites, as described above.

It is important to note that many of these funerary sites were probably frequented during many periods of inhabitation, i.e., from prehistory to recent times. Some of the funerary monuments may in fact be of prehistoric origin and only reused in more recent periods – even in modern times. Medieval and modern Arabic inscriptions are also often found at these sites. It therefore remains important to further study the exact nature and chronology of the funerary monuments at these sites through excavations. This will be done in Chapter 5.

3.5.3. Other sites

The remainder of sites documented in the Jebel Qurma region through pedestrian surveys at which datable remains from the Classical/Late Antique period were encountered did not feature funerary monuments or residential features. Instead, these sites often consisted mainly of pre-Islamic carvings or small ceramics scatters that were spatially associated with minor features such as markers, paths, or small temporary shelter-like features. It is difficult to say with certainty whether these features are chronologically, let alone functionally, related to the inscriptions or ceramics situated nearby. These site are merely suggestive of the frequentation of these locations, probably for a relatively short period of time.

Rock art clusters

Clusters of pre-Islamic carvings, sometimes associated with minor features as described above, were found at a total of 217 sites in the Jebel Qurma region. Many of these rock art clusters (96 sites, 44.2%) were associated with one or several small shelter like features, but whether these features are contemporaneous with the rock art was impossible to establish (as described in § 3.4.4.). Similar to funerary sites – where rock art occurs as well – rock art clusters mostly occur on elevated locations in the *harra* landscape (Fig. 3.45). They are mostly found in areas that were defined as topographic highs (see Chapter 2). However, rock art sites seem to penetrate the interior of the central plateau much more than funerary- and residential sites (for a more detailed overview of the distribution of carvings, see Brusgaard forthcoming). This distribution is probably indicative of daily movements and associated activities, such as watching over animals, within the broader landscape from those residing in the region.

Ceramic scatters

Two sites were defined merely on the occurrence of small quantities of Late Byzantine to Early Islamic ceramics, not associated with a clearing or other potential residential sites (QUR-15 and QUR-656). The

origin of these ceramics is therefore unclear, and although the sites seem to represent some kind of brief activity in these areas, the nature of these activities must remain unknown.

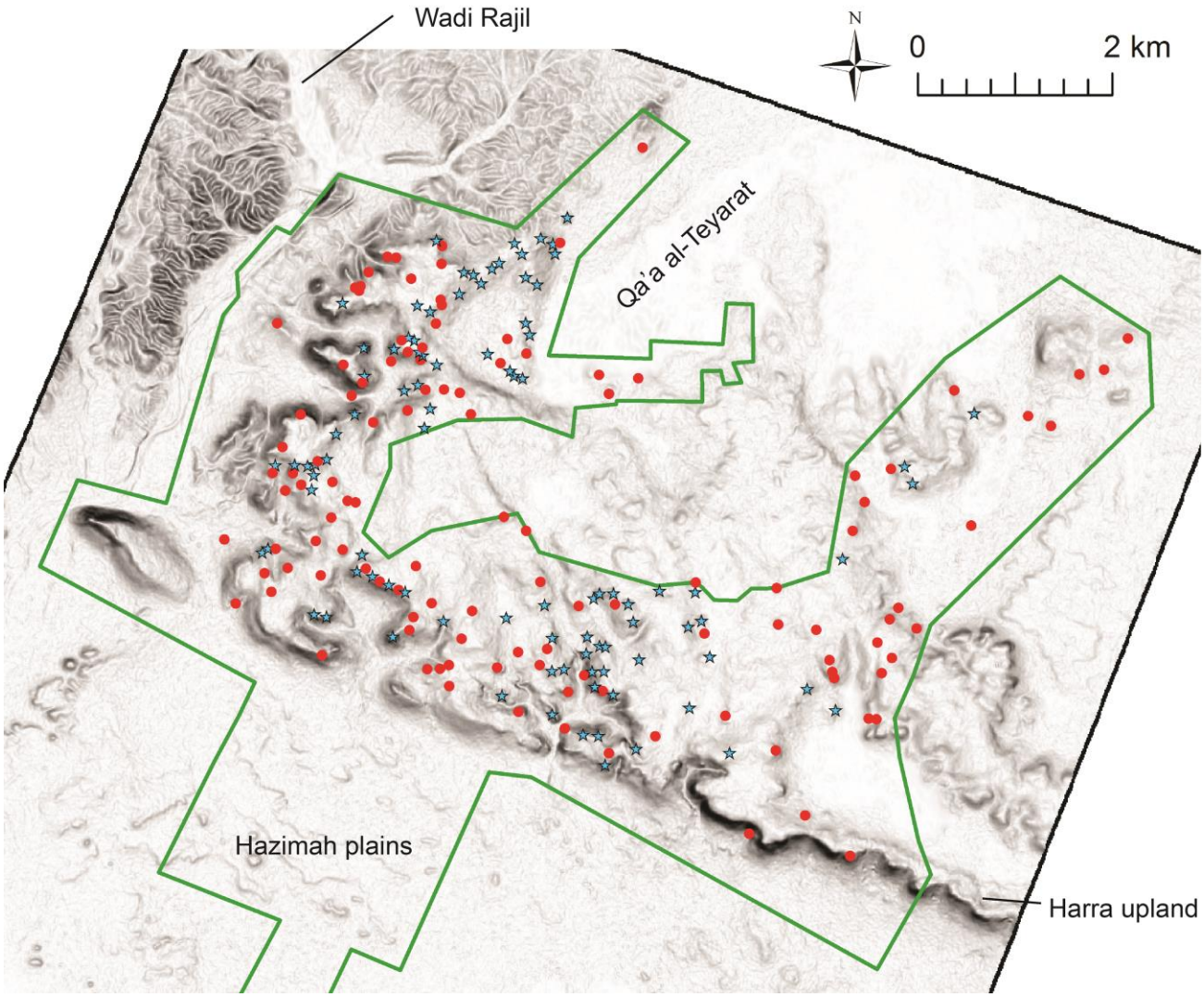


Figure 3.45: Distribution of sites containing pre-Islamic carvings that were not associated with residential or funerary features (red). Blue stars indicate rock art clusters associated with shelters. The survey area is indicated in green (no rock art clusters were encountered in the Hazimah plains). Base image: WorldDEM slope map.

Desert kites

Pre-Islamic inscriptions and petroglyphs were encountered in locations with desert kites, showing that these locations were at least frequented during Classical Antiquity. Two depictions of kites, which were earlier believed to be prehistoric (Akkermans et al. 2014), that were found close to an actual desert kite (QUR-21) are likely to be associated with the Safaitic inscriptions as well (Brusgaard forthcoming). Whether those who created these carvings actually made use of the kites, for hunting or for different purposes, remains unknown. Although the use of kites has been depicted in pre-Islamic carvings from other regions (see above) there are no indications from the Jebel Qurma region that suggests the kites from this area were used in historical times in a similar way.

Unrelated features and sites

While there are many sites and features in the Jebel Qurma region that could be associated with datable remains from the Classical and Late Antique periods, as presented above, others were dated to

prehistoric, medieval or modern times, or could not be dated with certainty. Features that seem to have been used exclusively in prehistory in the Jebel Qurma region include Wheels, which are clearly of prehistoric origin based on the association with chipped-stone artefacts and results from studies in other areas (see § 3.4.4.). There were no Classical/Late Antique ceramics associated with these features, however. Apparently, for one reason or another, the enclosures within the wheels were not deemed suitable for reuse in more recent times, in contrast to, for example, other types of enclosures (see above). The only evidence for the reuse of wheels is where burial cairns and pendants were constructed on top of them, which was the case, for example, at QUR-147 (Fig. 3.25) and QUR-148 (see Chapter 5). Another site type that appears to have been used exclusively in prehistory are the dwelling clusters. In the Jebel Qurma region, only at QUR-6 ceramics from the Classical/Late Antique period were collected, but in this case they are probably related to the enclosures and clearings located at the same site rather than to the dwellings.

Features that probably relate mostly to medieval and modern phases of inhabitation in the Jebel Qurma region include tent places and desert mosques. Many tent places were associated with modern trash rather than with Classical/Late Antique ceramics and in cases where such ceramics were encountered it is more likely that the tent places are overlying more ancient campsites. In case of the desert mosques, although it has sometimes been suggested that desert mosques appear as early as the Early Islamic period, there is no evidence from the survey results that suggests that this is the case in the Jebel Qurma region. The earliest remains associated with desert mosques are inscriptions from the Mamluk period.

3.6. CONCLUDING REMARKS

In this chapter an overview of archaeological and epigraphic remains from the Classical and Late Antique period has been presented, based on surface surveys. While this period of inhabitation in the Black Desert has long been understood mainly on the basis of textual sources, this chapter has shown that additional information may be obtained from the archaeological record. The archaeological 'visibility' of this period is reflected in a variety of ways. The ceramic corpus collected during pedestrian surveys in the Jebel Qurma region, broadly spanning the late 1st millennium BC and the 1st millennium AD, is one relevant example. These ceramics have the potential to define activity areas in the landscape, for example at clearings and enclosures, and may thus provide the means for an understanding of settlement patterning that cannot be achieved by focussing on rock art alone. This potential is further explored in the next chapter.

At the same time, however, one may wonder what the observed ceramic trends in themselves reflect. It is recalled here that there are, at this point, no ceramics that can be safely assigned an Iron Age date. Hellenistic and Roman-period sherds are fairly restricted in number, while the number of sherds becomes much higher during the Byzantine and Early Islamic period. Fatimid-period sherds, finally are again extremely rare. Caution, however, is warranted with regard to using these trends in reconstructing differences in occupational intensity. There are some indications that the ceramics trends indicate something different than the amount of people that frequented the Jebel Qurma region. For example, if we assume for the moment that the thousands of Safaitic inscriptions and associated petroglyphs from the study area indeed pre-date the Byzantine period, than the occupational intensity during the Hellenistic/Roman period must have been more considerable than is reflected by the ceramics. Another possibility, then, would be that the a limited number of ceramics – or a total absence thereof – from the preceding Iron Age does not imply limited occupation but, merely, limited use of pottery. This possibility and others are further explored in the next chapters.

In addition to ceramics and rock art different types of stone-built features have defined that were potentially constructed and/or used during the Classical and Late Antique period. To some degree, however, it has proved difficult to be conclusive about the date of these features on the basis of survey evidence alone, and their relation to artefacts and other features found nearby. For example, it was shown that there are a number of potential burial cairns that show a strong spatial association with pre-Islamic rock art. But while many hundreds of inscriptions and petroglyphs are sometimes found on top of or directly around burial cairns, this does not necessarily mean that there is chronological, let alone functional or meaningful relation between the two (cf. Macdonald 1992b, 304). These uncertainties are largely the result of restrictions imposed by the study of surface remains. The next chapters present an investigation of the relationship between such surface features on the basis of excavations.

3.6. CATALOGUE OF DATED POTTERY SHERDS

Catalogue no.	Site	Locus	Sherd no.	Type	Date	Parallels	Fabric
1.	HAZ-1	3	1	Cooking pot	Byzantine/ Early Islamic	Avissar 1996. Fig. XII.7:5; Parker 1998, Fig. 155:29	I
2.	HAZ-1	4	1	Closed vessel	Umayyad	Acconci & Gabrieli 1994, Fig. 46:14; Tushingham 1972, Fig. 6:7	C
3.	HAZ-15	2	1	Bowl	Roman	Gerber 2012, Fig. 3.13:3; Fig. 3.38:2-8	D
4.	HAZ-21	2	1	Unknown	Byzantine/Umayyad	Vokaer 2010-2011, Fig. 47:52	C
5.	HAZ-23	4	1	Cooking pot	Late Byzantine/ Early Islamic	Ball et al. 1986, Fig. 3.3; El-Khouri 2014, Fig. 9.3; McNicoll at al. 1982, Pl.140:1	H
6.	HAZ-27	2	1	Mortarium	Late Roman	Parker 2006, Fig. 16.37:191	E
7.	HAZ-44	3	1	Unknown	Hellenistic/Roman/ Byzantine/ Early Islamic	Khalil & Kareem 2002, Fig. 11; Renel 2010, Fig. 3:2, 4	B
8.	HAZ-TA88		1	Closed vessel	Late Byzantine	Tushingham 1972, Fig. 12:33	I
9.	HAZ-TB70		1	Unknown	Abbasid	Khalil & Kareem 2002, Fig. 8:18	D
10.	HAZ-TD2		1	Closed vessel	Roman/Byzantine/ Early Islamic	Berlin 2005, Fig. 9:7, 8; Walker 2012, Fig. 4.8:3	C
11.	HAZ-TD72		1	Closed vessel	Late Hellenistic	Schmid 2000, Fig. 292	C

Table 3.6: Hellenistic to Early Islamic ceramics collected during pedestrian surveys in the Jebel Qurma region.

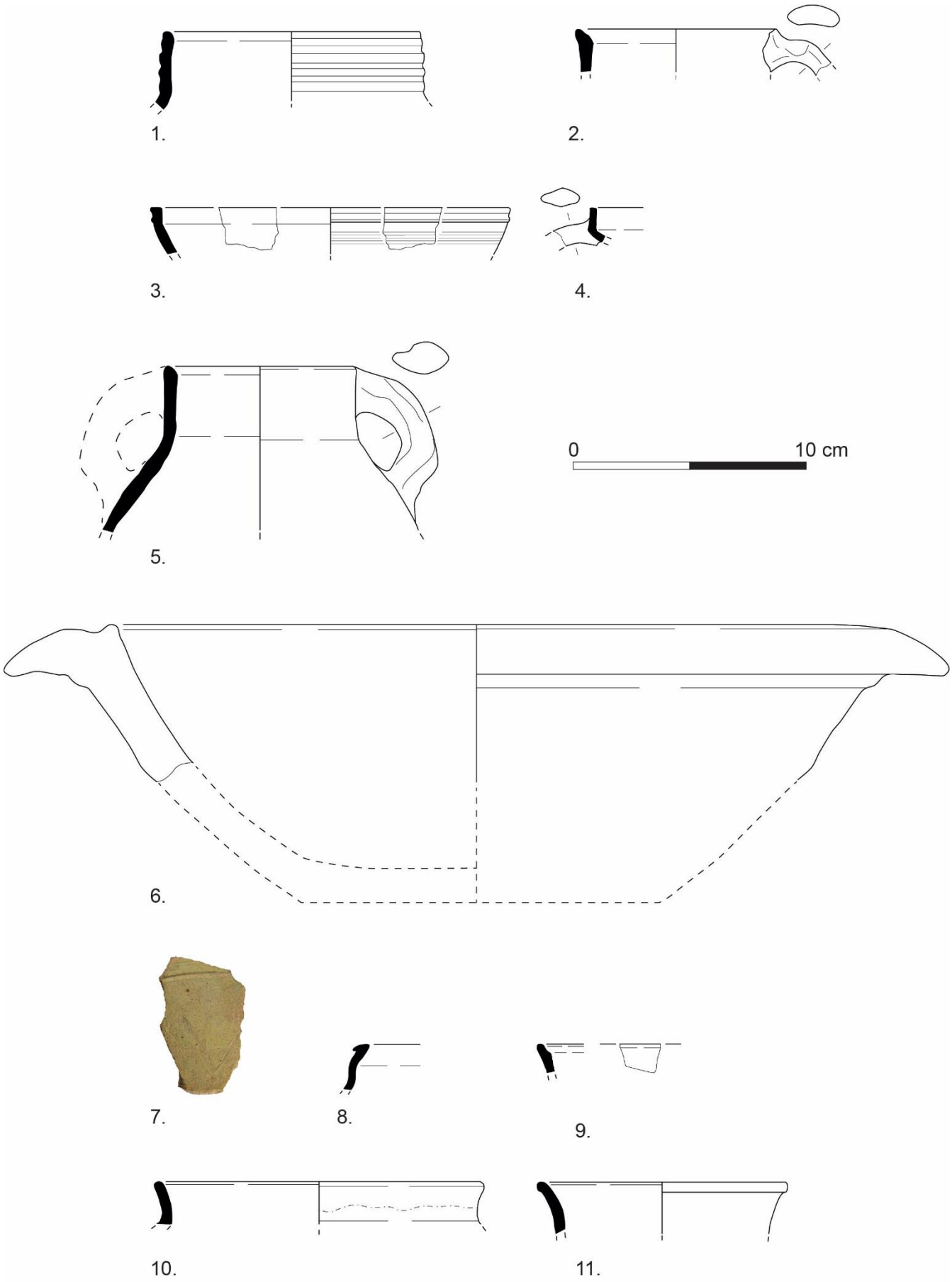


Figure 3.46: Hellenistic to Early Islamic ceramics collected during pedestrian surveys in the Jebel Qurma region (see Table 3.6. for details). Drawings by A. Kaneda.

Catalogue no.	Site	Locus	Sherd no.	Type	Date	Parallels	Fabric
12.	QUR-1	1	8	Open vessel	Abbasid	Khalil & Kareem 2002, Fig. 8:2	C
13.	QUR-2	11	1	Unknown	Late Hellenistic/ Early Roman	Berlin 1997, Pl. 68:PW536	B
14.	QUR-6	20	1	Bowl	Abbasid	Khalil & Kareem 2002, Fig. 9:16	H
15.	QUR-6	20	2	Closed vessel	Roman/Byzantine	Johnson 2006, Fig. 15.6:122; Reynolds & Waksman 2007: Fig. 17	H
16.	QUR-6	20	3	Closed vessel	Late Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Parker 1998, 215; Smith 1973; Smith & Day 1989; Tushingham 1972, 67-76	B
17.	QUR-6	57	1	Cooking pot	Late Hellenistic/ Roman/Byzantine	Bar-Nathan 2002, Pl. 11:124; Berlin 2005, Fig. 9:5, 6; Gerber 2012, Fig. 3.50:7; Magness 1993, p. 216 Form 1A; Tushingham 1972, Fig. 9:12, 13	C
18.	QUR-15	1	1	Closed vessel	Umayyad	Acconci & Gabrieli 1994, Fig. 46:14; Tushingham 1972, Fig. 7:8	C
19.	QUR-22	1	4	Lamp	Late Byzantine/ Umayyad	Kehrberg 1989, Fig. 5	C
20.	QUR-22	1	6	Closed vessel	Umayyad/Abbasid	Olávarri-Goicoechea 1985, Fig. 15; Walker 2012, Fig. 4.1:23	C
21.	QUR-22	1	7	Closed vessel	Umayyad/Abbasid	Walker 2012, Fig. 4.1:16	C
22.	QUR-23	6	1	Closed vessel	Umayyad	Walker 2012, Fig. 4.8:1	C
23.	QUR-123	11	1	Cooking pot	Late Byzantine/ Umayyad	Bar-Nathan 2011, Fig. 11.3:11; Gerber 2012, Fig. 3.63:13	H

Table 3.6 (continued)

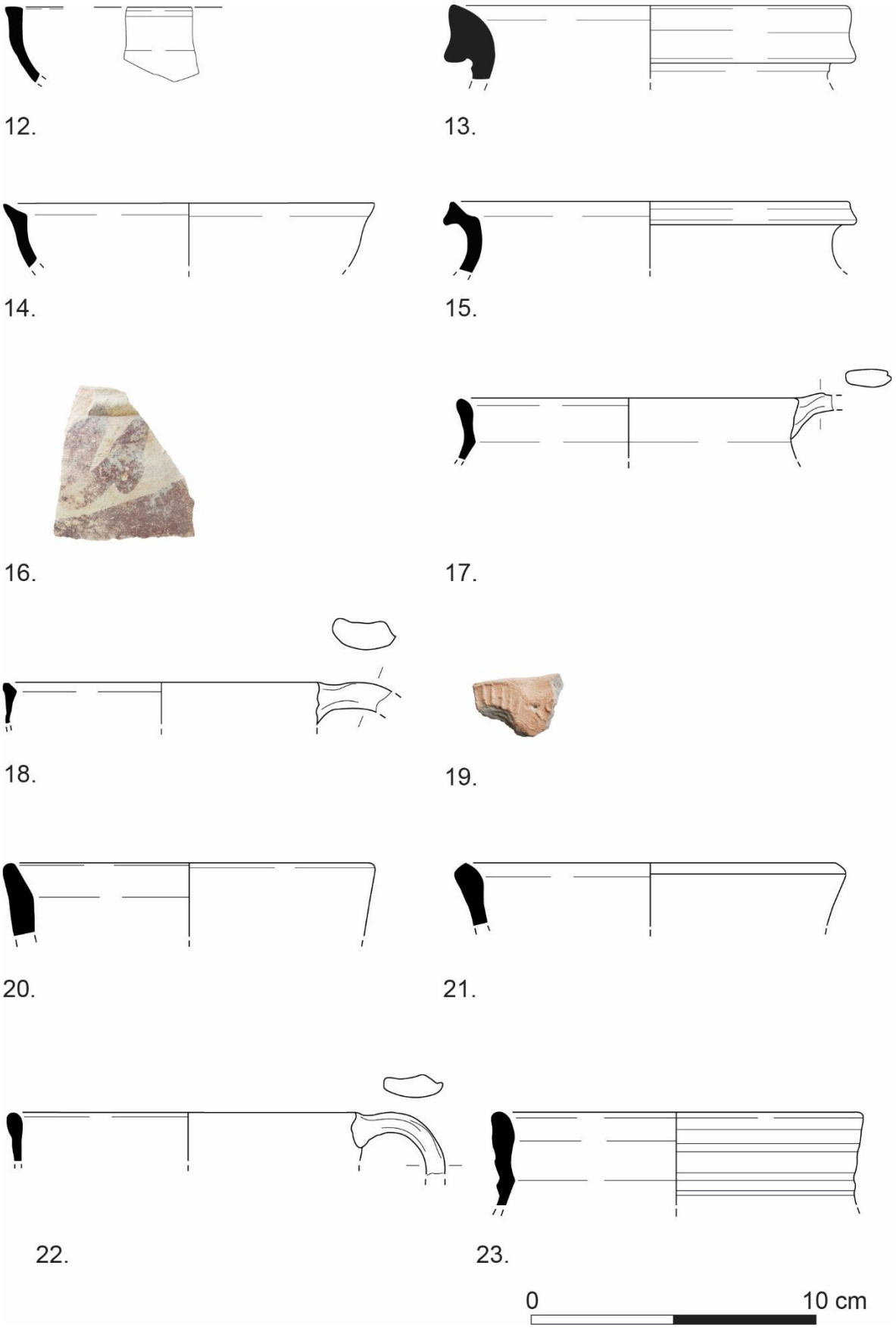


Figure 3.46 (continued)

Catalogue no.	Site	Locus	Sherd no.	Type	Date	Parallels	Fabric
24.	QUR-140	7	1	Cooking pot	Byzantine/ Early Islamic	Avissar 1996, Fig. XII.7:5; Parker 1998, Fig. 155:29	H
25.	QUR-146	50	4	Cooking pot	Late Byzantine/ Early Islamic	Ball et al. 1986, Fig. 3.3; El-Khouri 2014, Fig. 9.3; McNicoll et al. 1982, Pl.140:1	H
26.	QUR-162	2	1	Cooking pot	Late Byzantine/ Early Islamic	Ball et al. 1986, Fig. 3.3; El-Khouri 2014, Fig. 9.3; McNicoll et al. 1982, Pl.140:1	H
27.	QUR-162	16	1	Cooking pot?	Umayyad	Acconci & Gabrieli 1994, Fig. 46:14	I
28.	QUR-162	24	1	Closed vessel	Roman/Byzantine	Balouka 2013, Pl. 8:13; Magness 1994, Fig. 1:16-17	C
29.	QUR-162	25	1	Cooking pot	Umayyad	Parker 1998, Fig. 155:29	H
30.	QUR-162	34	1	Cooking pot	Late Byzantine/ Early Islamic	Ball et al. 1986, Fig. 3.3; El-Khouri 2014, Fig. 9.3; McNicoll et al. 1982, Pl.140:1	H
31.	QUR-162	38	1	Cooking pot	Late Byzantine/ Early Islamic	Ball et al. 1986, Fig. 3.3; El-Khouri 2014, Fig. 9.3; McNicoll et al. 1982, Pl.140:1	H

Table 3.6 (continued)

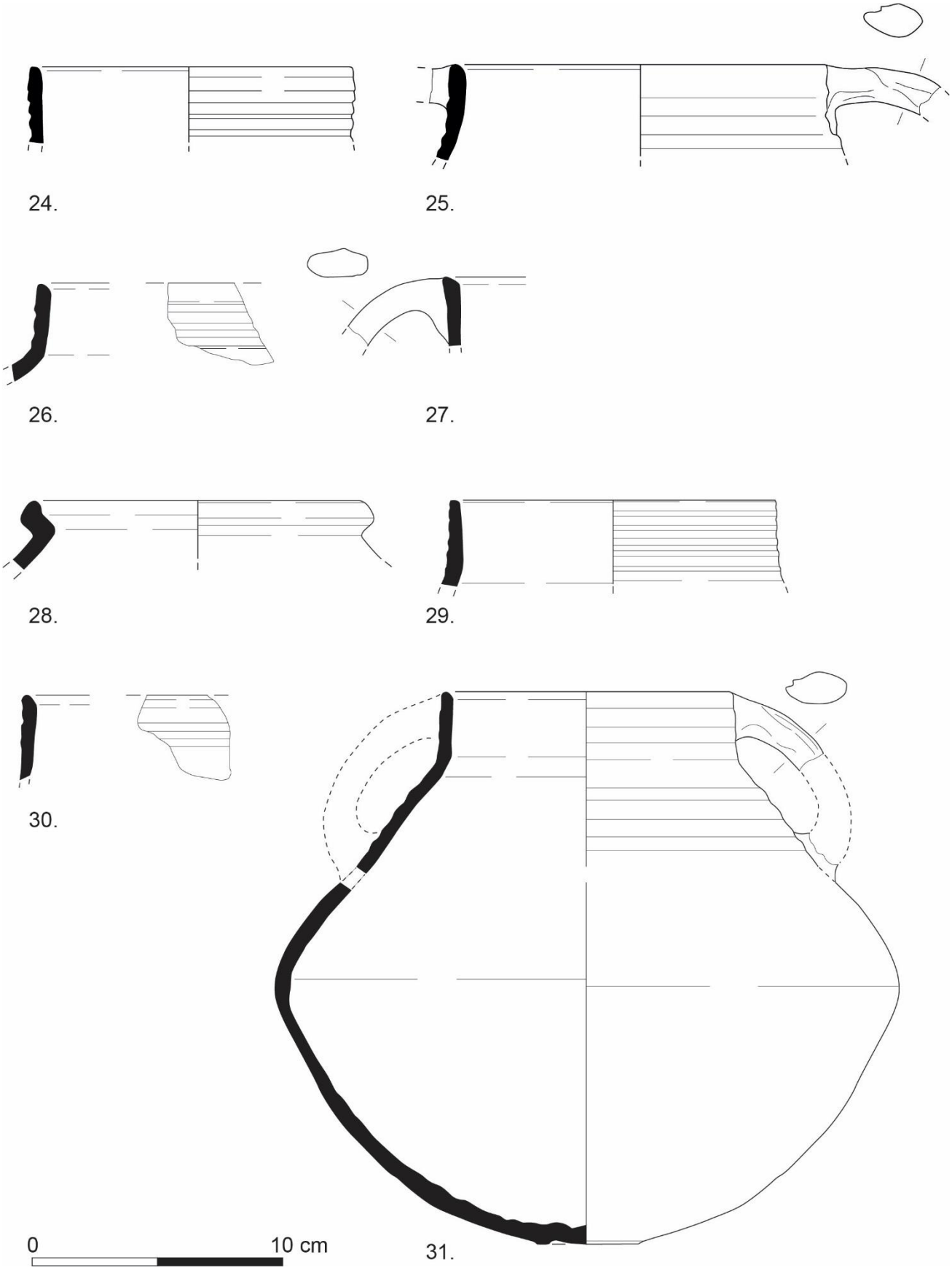


Figure 3.46 (continued)

Catalogue no.	Site	Locus	Sherd no.	Type	Date	Parallels	Fabric
32.	QUR-175	5	1	Closed vessel	Hellenistic	Kuhnen 1989, Pl. 31:3	E
33.	QUR-175	12	1	Closed vessel	Late Roman/ Byzantine/ Umayyad	Balouka 2013, Pl. 30:5, 7; Bar-Nathan 2011, Fig. 11.6:6	C
34.	QUR-175	12	3	Open vessel	Abbasid/Fatimid	Khalil & Kareem 2002, Fig. 12:17; Walker 2012, Fig. 4.13:2	H
35.	QUR-175	15	2	Open vessel?	Abbasid	Khalil & Kareem 2002, Fig. 10:9	E
36.	QUR-175	15	4	Cooking pot	Late Byzantine/ Umayyad	Parker 1998, Fig. 155:29; Bar-Nathan 2011, Fig. 11.3:1	H
37.	QUR-175	17	1	Closed vessel	Late Roman/ Byzantine/ Umayyad	Balouka 2013, Pl. 30:5, 7; Bar-Nathan 2011, Fig. 11.6:6	E
38.	QUR-175	18	2	Cooking pot	Late Roman/ Byzantine/ Umayyad	Acconci & Gabrieli 1994, Fig. 46:14; Bar-Nathan 2011, Fig. 11.3:10; Magness 2003, Pl. 18.2:16; Tushingham 1972, Fig. 6:19	H
39.	QUR-175	18	6	Open vessel	Early Islamic	Walker 2012, Fig. 4.2:12	I
40.	QUR-185	11	1	Cooking pot	Umayyad	Olávarri-Goicoechea 1985, Fig. 18:2	C
41.	QUR-210	34	1	Closed vessel	Umayyad	Clark et al. 1986, Fig. 21:10, 17; McNicoll et al. 1982, Pl. 141:4; Walker 2012, Fig. 4.4:18	E
42.	QUR-257	2	1	Closed vessel	Hellenistic	McNicoll et al. 1982, Pl. 127:8	C
43.	QUR-295	1	1	Cooking pot	Hellenistic/ Early Roman	Bar-Nathan 2006, Pl. 32:2; Berlin 1997, Fig. 13:PW201; Johnson 2006, Fig. 15.3:47	C
44.	QUR-337	2	1	Cooking pot	Islamic	Cytryn-Silverman 2010, Pl. 26:9; Parker 1998, Fig. 155:29	H
45.	QUR-347	2	1	Bowl	Byzantine/ Early Islamic	Cytryn-Silverman 2010, Pl. 9.35: 8; Walker 2012, Fig. 4.3:14	C

Table 3.6 (continued)

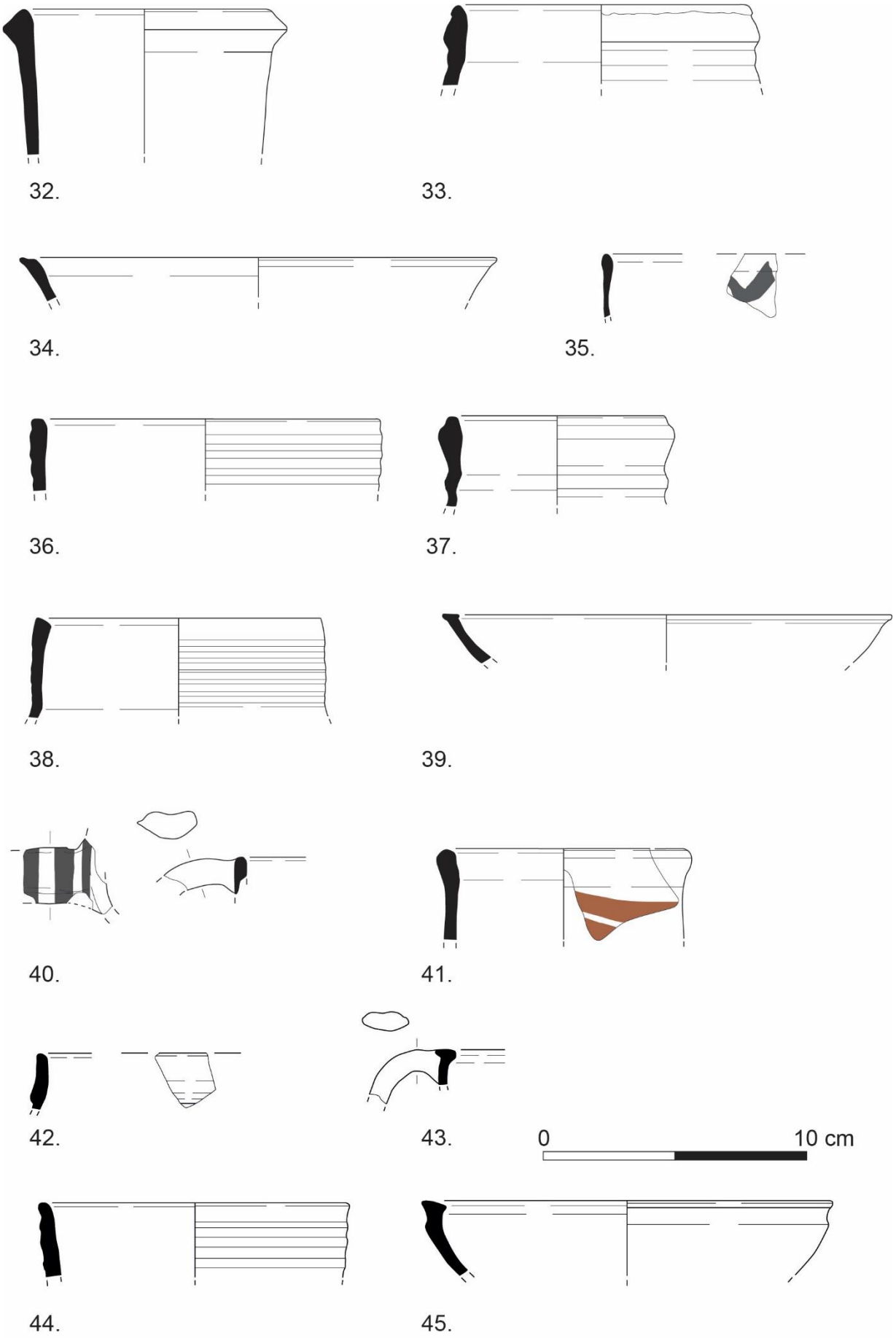


Figure 3.46 (continued)

Catalogue no.	Site	Locus	Sherd no.	Type	Date	Parallels	Fabric
46.	QUR-360	1	2	Open vessel	Byzantine	Johnson 2006, Fig. 15.13:268	C
47.	QUR-370	1	4	Closed vessel	Umayyad	Tushingham 1972, Fig. 6:19	B
48.	QUR-370	2	1	Closed vessel	Early Byzantine	Gerber 2012, Fig. 3.46:5	C
49.	QUR-373	1	3	Closed vessel	Abbasid	Khalil & Kareem 2002, Fig. 13:16	D
50.	QUR-373	9	9	Unknown	Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Cytryn-Silverman 2010, Pl. 9.10:4; Johnson 2006, Fig. 15.13:274, 275; Khalil & Kareem 2002; Smith & Day 1989, Pl. 50:24; Tushingham 1972	E
51.	QUR-373	10	3	Unknown	Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Cytryn-Silverman 2010, Pl. 9.10:4; Johnson 2006, Fig. 15.13:274, 275; Khalil & Kareem 2002; Smith & Day 1989, Pl. 50:24; Tushingham 1972	E
52.	QUR-373	10	27	Closed vessel	Early Islamic	Daviau 2010, Fig. 8.10:5; Najjar 1989, Fig. 6:24; Walker 2012, Fig. 4.4:7	E
53.	QUR-373	10	28	Closed vessel	Late Byzantine	Smith & Day 1989, Pl. 52:15	H
54.	QUR-373	17	6	Closed vessel	Late Byzantine/ Early Islamic/ Fatimid	Cytryn-Silverman 2010, Pl. 9.8:1; Smith & Day 1989, Pl. 48:6	H
55.	QUR-373	17	10	Closed vessel	Late Hellenistic/ Roman/ Byzantine/ Early Islamic	Bar-Nathan 2002, Pl. 27:504; Berlin 2005, Fig. 6.:3, 4; Daviau 2010, Fig. 8.9:8; Kuhnen 1989, Pl. 45:4	I
56.	QUR-373	17	11	Unknown	Late Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Parker 1998, 215; Smith 1973; Smith & Day 1989; Tushingham 1972, 67-76	E
57.	QUR-373	18	1	Unknown	Late Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Parker 1998, 215; Smith 1973; Smith & Day 1989; Tushingham 1972, 67-76	D
58.	QUR-389	1	2	Unknown	Late Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Parker 1998, 215; Smith 1973; Smith & Day 1989; Tushingham 1972, 67-76	D
59.	QUR-393	1	1	Closed vessel	Late Byzantine	Gerber 2012, Fig. 3.70:25	C
60.	QUR-396	4	2	Closed vessel	Byzantine/ Early Islamic	Bar-Nathan 2011, Fig. 11.4:6; Bar-Nathan & Adato 1986, Fig. 1:4; Cytryn-Silverman 2010, Pl. 9.18:3	H
61.	QUR-446	1	3	Open vessel	Byzantine	Johnson 2006, Fig. 15.13:268	C

Table 3.6 (continued)

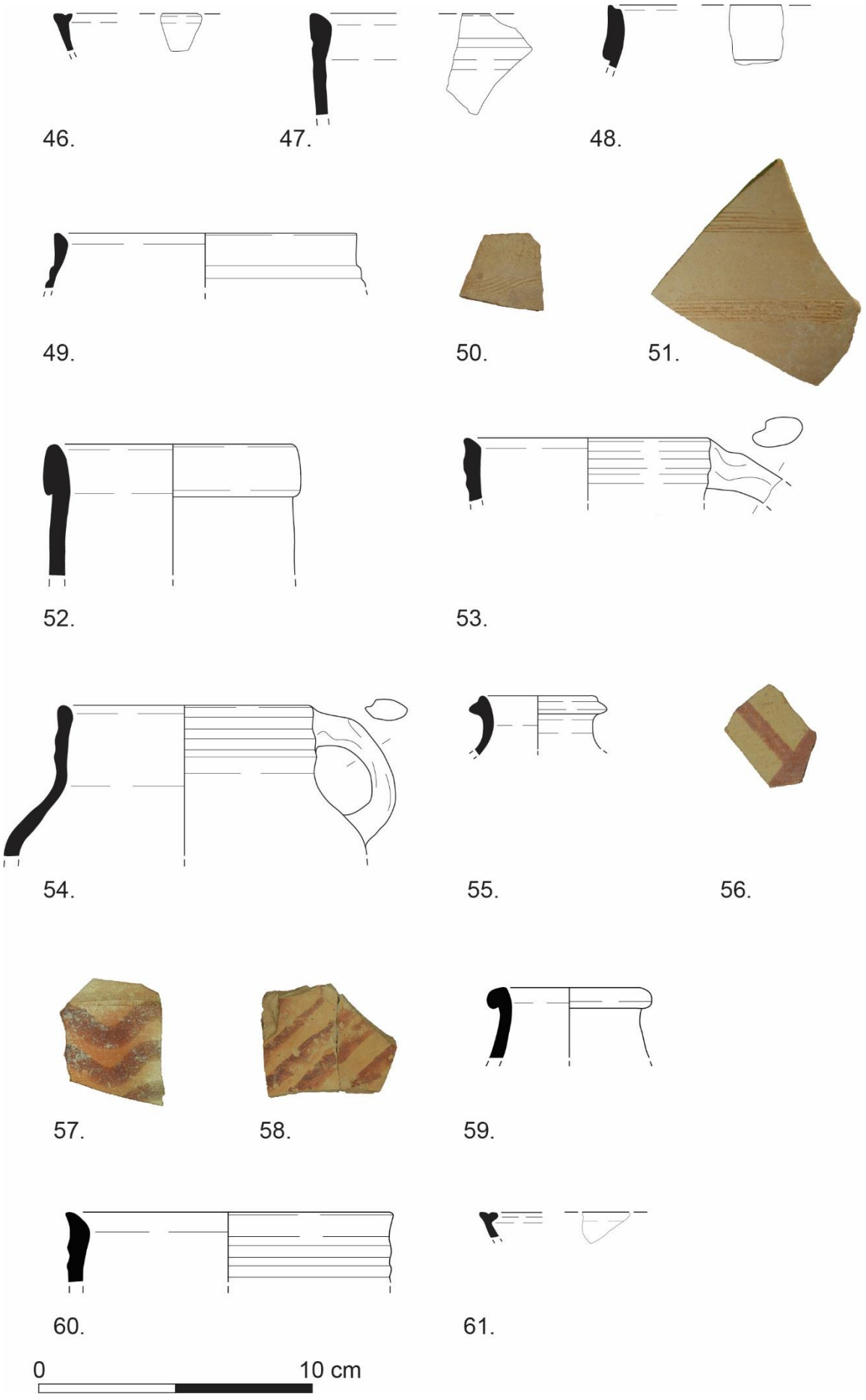
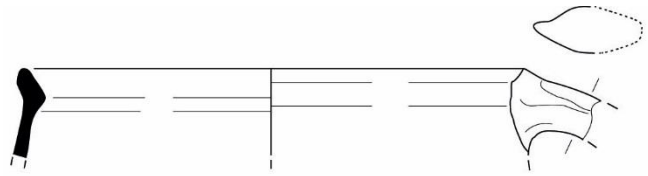


Figure 3.46 (continued)

Catalogue no.	Site	Locus	Sherd no.	Type	Date	Parallels	Fabric
62.	QUR-490	1	1	Cooking pot	Roman	Gerber 2012, Fig. 3.26:3	H
63.	QUR-533	2	1	Open vessel	Late Roman/ Byzantine	Johnson 2006, Fig. 15.9: 179, 182; Fig. 15.6:10	F
64.	QUR-595	20	2	Closed vessel	Byzantine	Johnson 2006, Fig. 15.12:25; Tushingham 1972, Fig. 12:5	C
65.	QUR-615	2	1	Unknown	Late Byzantine	Gerber 2012, Fig. 3.71:8	D
66.	QUR-619	2	2	Unknown	Late Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Parker 1998, 215; Smith 1973; Smith & Day 1989; Tushingham 1972, 67-76	E
67.	QUR-619	11	6	Closed vessel	Umayyad	Smith & Day 1989, Pl. 58:20	H
68.	QUR-619	11	7	Closed vessel	Early Byzantine	Gerber 2012, Fig. 3.45:7	D
69.	QUR-619	11	8	Unknown	Late Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Parker 1998, 215; Smith 1973; Smith & Day 1989; Tushingham 1972, 67-76	E
70.	QUR-619	11	9	Closed vessel	Late Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Parker 1998, 215; Smith 1973; Smith & Day 1989; Tushingham 1972, 67-76	E
71.	QUR-619	11	10	Unknown	Late Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Parker 1998, 215; Smith 1973; Smith & Day 1989; Tushingham 1972, 67-76	E
72.	QUR-619	12	33	Unknown	Late Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Parker 1998, 215; Smith 1973; Smith & Day 1989; Tushingham 1972, 67-76	E
73.	QUR-632	3	1	Closed vessel	Iron Age II/ Hellenistic	Berlin 1997, Pl. 57:PW80; Kuhnen 1989, Pl. 34:5; Lapp 2008, Pl 2.7:4	B
74.	QUR-637	1	5	Closed vessel	Late Roman/ Byzantine/ Umayyad	'Amr & Schick 2001, Fig. 9:20-21; Magness 1993, pp. 232 no. 5; Tushingham 1972, Fig. 9:16	C
75.	QUR-645	1	1	Closed vessel	Late Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Parker 1998, 215; Smith 1973; Smith & Day 1989; Tushingham 1972, 67-76	E
76.	QUR-645	2	5	Closed vessel	Late Hellenistic/ Early Roman	Bar-Nathan 2002, Pl. XI:4; Gerber 2012, Fig. 3.20:4 - 73-135 AD; Geva & Hershkovitz 2006, Pl. 4.13:2; Geva & Rosenthal-Heginbottom 2003, Pl. 6.10:5	C
77.	QUR-645	2	6	Closed vessel	Hellenistic	Johnson 2006, Fig. 15.4:69, 80	B

Table 3.6 (continued)



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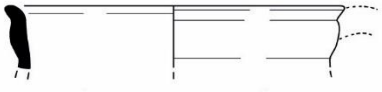

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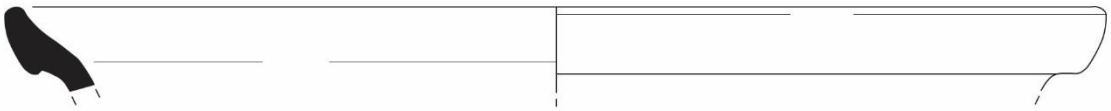

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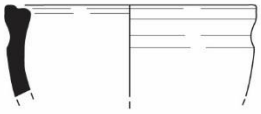

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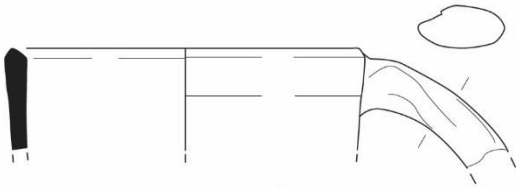

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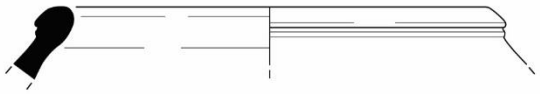

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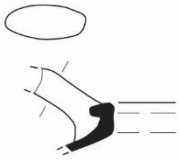

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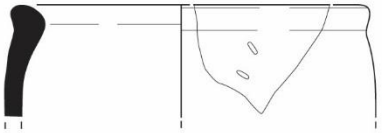

76.

77.

Figure 3.46 (continued)

Catalogue no.	Site	Locus	Sherd no.	Type	Date	Parallels	Fabric
78.	QUR-651	1	1	Closed vessel	Fatimid	Walker 2012, Fig. 4.13:24	E
79.	QUR-653	1	1	Bowl	Roman	Gerber 2012, Fig. 3.36:10	C
80.	QUR-656	1	2	Closed vessel	Late Byzantine/ Early Islamic	Alliata 1991, Fig. 18:2; McNicoll et al. 1982, Pl. 141:4; Smith 1973, Pl. 31:105, 1158; Smith & Day 1989, Pl. 54:2	E
81.	QUR-661	1	3	Unknown	Late Byzantine/ Early Islamic	Hendrix et al. 1996, 238-279; Parker 1998, 215; Smith 1973; Smith & Day 1989; Tushingham 1972, 67-76	E
82.	QUR-735	1	4	Closed vessel	Byzantine	Gerber 2012, Fig. 3.70:12; Magness 1993, pp. 219-20	I
83.	QUR-735	5	2	Closed vessel	Umayyad	Acconci & Gabrieli 1994, Fig. 46:14	C
84.	QUR-735	11	1	Closed vessel	Late Byzantine	Smith & Day 1989, Pl. 49:11	B
85.	QUR-735	14	1	Closed vessel	Late Byzantine	Smith & Day 1989, Pl. 49:7	C
86.	QUR-735	16	3	Closed vessel	Late Byzantine	Gerber 2012, Fig. 3.70:12; Tushingham 1972, Fig. 12:26	H
87.	QUR-759	2	1	Unknown	Roman	Balouka 2013, Pl. 15:10; Gerber 2012, Fig 3.30:20; Fig 3.31:5, 11, 12	C
88.	QUR-768	3	2	Unknown	Late Roman/ Byzantine	Balouka 2013, Pl. 28:8	C
89.	QUR-773	1	1	Closed vessel	Late Roman/ Byzantine	Acconci & Gabrieli 1994, Fig. 24:1; Kuhnen 1989, Pl. 42:5	H
90.	QUR-785	1	1	Closed vessel	Abbasid	Khalil & Kareem 2002, Fig. 13:17	B
91.	QUR-787	3	1	Unknown	Late Roman	Gerber 2012, Fig. 3.41:31; Fig 3.28:26	C
92.	QUR-833	1	3	Closed vessel	Byzantine	Gerber 2012, Fig. 3.70:12; Fig. 3.86:15; Tushingham 1972, Fig. 12:26	C

Table 3.6 (continued)

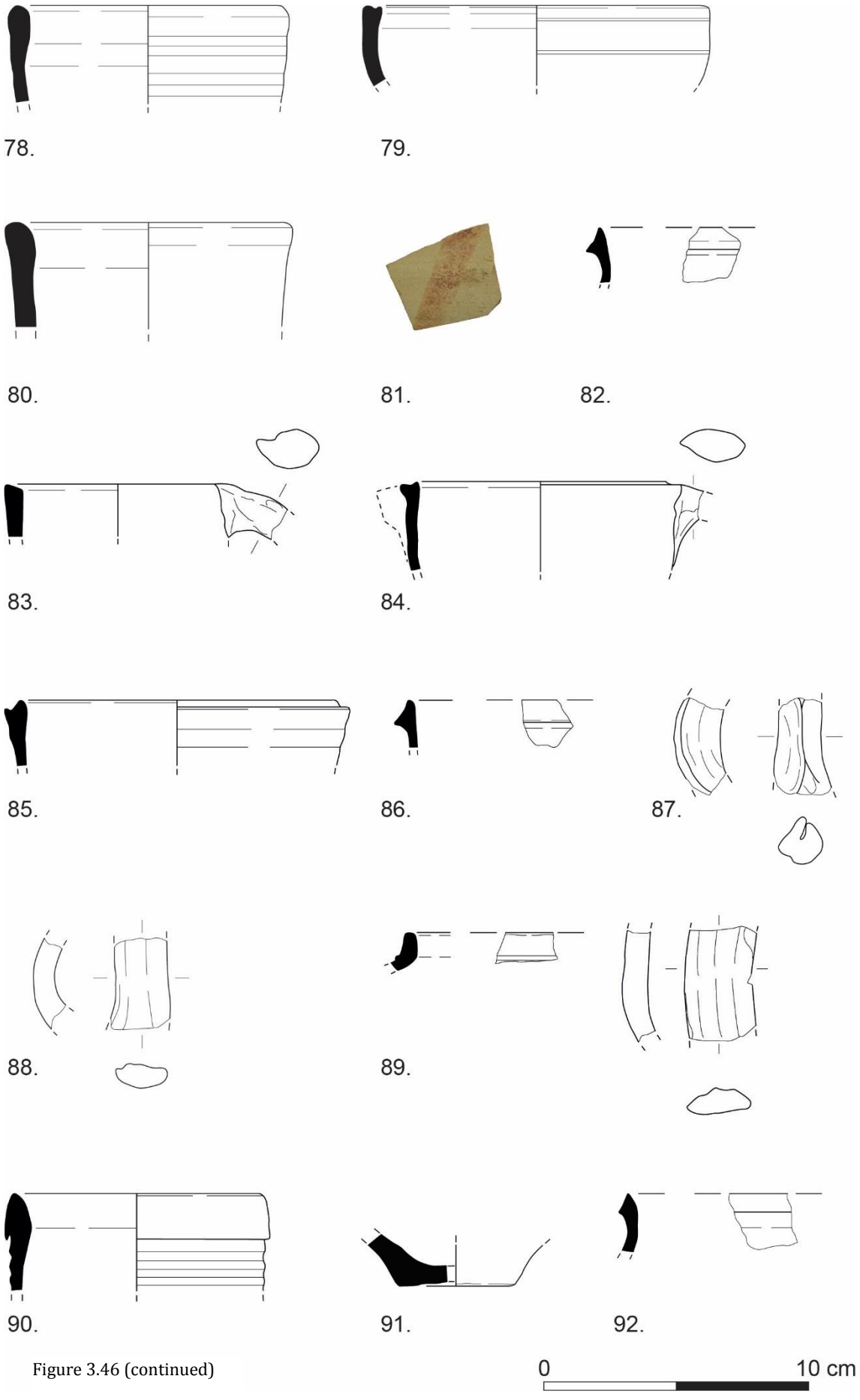

Figure 3.46 (continued)

Catalogue no.	Site	Locus	Sherd no.	Type	Date	Parallels	Fabric
93.	QUR-851	1	1	Cooking pot	Roman/Early Byzantine	Acconci & Gabrieli 1994, Fig. 27:10, 11; Bar-Nathan 2006, Pl. 29:42; Northedge 1992, Fig. 123:4	C
94.	QUR-1016	1	1	Closed vessel	Iron Age II/ Hellenistic/ Roman/ Byzantine/ Early Islamic	Johnson 2006, Fig. 15.3:64; Lapp 2008, Pl. 2.10:4; Smith 1973, Pl. 43:1252	F
95.	QUR-1016	17	1	Open vessel	Abbasid	Khalil & Kareem 2002, Fig.8:5, 13, 18	C
96.	QUR-1022	4	1	Cooking pot	Umayyad	Acconci & Gabrieli 1994, Fig. 46:14	H

Table 3.6 (continued)

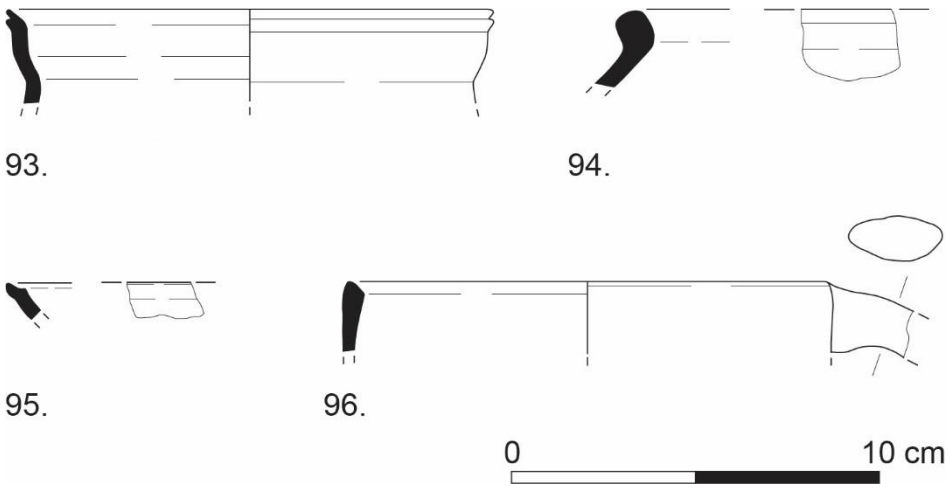

Figure 3.46 (continued)