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FORTS OF NORTH OMDURMAN

Mariusz DRZEWIECKI and Aneta CEDRO

PEETERS

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with contributions by

Paweł BĄCAL, Agata BEBEL-NOWAK, Andrzej OSTROWSKI,
Marta OSYPIŃSKA, Olga SYTA, Joanna THEN-OBŁUSKA, Barbara WAGNER,
Dobrochna ZIELIŃSKA and Grażyna Zofia ŻUKOWSKA

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Cover illustration:
Jebel Umm Marrahi, remains of the fort, from the south-east (photo Mariusz Drzewiecki).

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CHAPTER 1

FORTS IN UPPER NUBIA

Mariusz DRZEWIECKI and Aneta CEDRO

Upper Nubia – Land and environment

Upper Nubia is a part of present-day northern and central Sudan. It is a magnificent land where the sands of the desert are sliced by the longest river in Africa, creating landscapes full of contrasts (**Figure 1.1**). Harsh, rocky hills and plains are next to lush green fields, palm groves and orchards. The desert constantly confronts the river. This is particularly noticeable in the Southern Dongola Reach, where numerous unstoppable dunes are pushing the Nile southward. The main channel in this region is meandering, leaving the villages on the northern bank to be taken by the desert (Żurawski 2003, 229).

People in Nubia create their permanent settlements where water is available. Oases, wells, and wadis are the places where hamlets develop. However, the banks of the river are, in this context, the most suitable places. The valley inhabitants are not frightened away by the extreme floods of the river nor by dust storms coming from the desert. They have been living on the edges of the river-scape and desert-scape for centuries, on the one hand suffering from both, and on the other hand exploiting each environment.

The northern border of Upper Nubia is located in the Third Cataract Region (Edwards 1989, 3–8). There, and farther upriver, the desert has minimal water resources and permanent settlement is hard or even impossible. Close by are the Nile Valley villages, established centuries ago, where water was never a problem. The situation changes in the regions to the south of the Fifth Cataract, where rainfall is more frequent and the Nile is supplemented by its tributary, the Atbara River. Water-collecting installations such as hafirs can be

Figure 1.1. The landscape of the Middle Nile Valley at the Third Cataract Region, facing east (photo Mariusz Drzewiecki)

Figure 1.2. The southern fringes of Nubia, the landscape of the Lower Blue Nile, facing south-east (photo Mariusz Drzewiecki)

observed in the region. There the semi-desert environment slowly develops, providing people with easier, and frequently used, travel routes across the country.

The southern limit of Upper Nubia is difficult to establish (Welsby 2002, 7). Some have suggested that Nubia is where the Nubian people live; however, today Nubians reside in many parts of Sudan. They have been resettled or have simply moved in search of work to the cities. Their traditional home is the Nile Valley in southern Egypt and the Northern State in Sudan, with the southernmost limit located in the Southern Dongola Reach. This can be somewhat confusing when compared with information available about medieval settlement. In the Middle Ages, the capital of the southernmost Nubian kingdom, Alwa, was located in the Lower Blue Nile region, several kilometres south of the confluence of the Blue Nile and the White Nile. This indicates that medieval Nubian settlement covered larger parts of the country in the past, including the modern Northern State, River Nile State, Khartoum State and Gezira State.

In Khartoum, and especially in Gezira State, the environment is very different from northern Nubia (**Figure 1.2**). The desert here is greener and the rainfall is more frequent: a semi-savannah landscape is emerging. With vast and flat plains, the land is now the country's agricultural heart, where grand irrigation schemes have turned the Gezira into a continuous land of fields. Transport and trade in the region can easily be shifted away from the river and its banks, to areas farther inland. The river is still important for the inhabitants, but no longer has a crucial and indispensable role.

Upper Nubia at its maximum stretches from the Third Cataract to the Lower Blue Nile Region, constituting approximately a 1200km territory along the river. In this area, most of the large medieval and post-medieval settlements are located on the river banks or a few kilometres from the Nile Valley. There are exceptions, like sites in the Lower Wadi Abu Dom (Lohwasser *et al*. 2018), the recently discovered sacral complex in Jebel al-Ain (Eger 2011) or the churches in the Ga'ab depression (Tahir 2012); however, the capital cities and main centres of the Nubian realms were in the Nile Valley.

Remains of settlement dated to the Meroitic and earlier periods can either be located on the banks of the river or at a considerable distance from the Nile (Edwards 1989). The Nile, while important, was not the only choice for the settlers during those periods. Ongoing research in the Bayuda Desert has documented architectural complexes preliminarily dated to the Meroitic period, located deep in the desert (Eigner and Karberg 2013, 53–57). The best region to illustrate the variation in the settlement patterns lies south of the Fifth Cataract, where the main Kushite sites can be found in the Nile Valley, as well as farther inland in the Butana and Karaba regions.

In conclusion, towards the beginning of the medieval period, a shift in the settlement pattern in Upper Nubia may be observed. With the beginning of the kingdoms of Makuria and Alwa, new places in the river valley became the focus of the main centres of power.

From Meroe to the Nubian kingdoms in modern and historical narratives

The period of transition, between the 2nd and 7th century AD, has fascinated many researchers (e.g. Reisner 1910; 1923; Shinnie 1955; Kirwan 1957; 1960; 1982;

Török 1988; 1999; Lenoble 1999; El-Tayeb 2010; 2012; Edwards 2004; 2011; Rilly 2010), perhaps because it cannot be simply explained using general theories such as evolution or diffusion. With the end of the long-lasting Kushite rule, some aspects of culture declined while others changed or developed. State-sponsored specialised manufacture, such as pottery production, faded away. At the same time however, continuities and discontinuities between Meroitic and Post-Meroitic periods are still debated in the context of pottery production, burial rituals, language etc. New elites emerged with an extremely complex material culture, visible in the variation and complexity of the tumuli graves (El-Tayeb 2012). At the same time, the identity of Nubians mentioned in various written sources, as well as the meaning of the word itself, is still being analysed (Edwards 2018, 540–542). The transformation of Nubia into three medieval kingdoms leaves many questions unanswered. The young kingdoms are astonishing with the high level of craftsmanship visible in their material culture and their complex territorial organisation.

The recent research project, *Environmental Changes and the Collapse of the Kingdom of Meroe, Sudan* by Iwona Kozieradzka-Ogunmakin[1] advocated that a shift in climate and environment may have been one of the causes for the change in settlement pattern. People started to move into the Nile Valley when other areas became too difficult to occupy. Interestingly, and partly in agreement with this idea, is the paper by Jane Humphris and Barbara Eichhorn (2019), which looks closer into the issue of environment degradation around Meroe City. They concluded that the landscape of ancient Meroe may have been more forested during the Meroitic phase, than in the periods that followed. Based on an analysis of charcoal data from production sites, neither fuel shortage nor environmental degradation were identified at any point in time during the entire production period (Humphris and Eichhorn 2019, 50). Future research on other sites, and in other regions is needed, and may bring further interesting insights and evidence in support of the idea of environmental changes.

A slightly different approach begins with the issue of the change in subsistence economy, especially within the Nobadian and Makurian territories. This hypothesis is based on the idea that the introduction of new crops and irrigation techniques increased the value of fertile lands by the Nile (Fuller 2014; Edwards 2018, 546). This gradually caused more people to alter their lifestyle from mobile animal husbandry to more sedentary agricultural occupations closer to the river.

When written sources are taken into account, in the northern lands (Lower Nubia), the end of Meroe was influenced by political manoeuvrings involving the Roman Empire, the Blemmyes and the Nubians (Török 2011). The testimony of Olympiodorus, correspondence between rulers, the inscription of Silko at Kalabsha and other sources allow us to consider the battles for power and reflect upon the complex and unstable situation. As for the southern lands (Upper Nubia), rare written sources make it difficult to perceive and identify all of the agents involved in the struggles. The Aezana inscriptions (Eide *et al.* 1998, 1066–1072, 1094–1103) indicate a number of principal factors that led to the significant weakening of the heartlands of the Meroitic Kingdom.

The incursions led by the rulers of Axum in the 4th century AD have been put forward as the main factor for this weakening. Inscriptions describing the Aezana wars are extremely significant for the discussion, as they may suggest what happened to the socio-political structures in the heartland of Meroe. Due to titular differences occurring in the king's name, these texts are generally dated to the mid-4th century AD. What may be concluded from these texts is that the rulers of Axum appear to have launched several military campaigns where their armies descended from the Abyssinian Highlands and attacked Meroitic territory. Their opponents in one such campaign were rebellious Nubians.

At that time Meroe was facing internal problems; Nubians seized control of Meroitic towns between the Blue and White Niles, and of unspecified lands downriver from Meroe (Welsby 2002, 14–15). Simultaneously, Lower Nubia was undergoing a significant political transformation. As a result, the Meroitic rulers lost their dominant position in most of the Middle Nile Valley in the 4th century AD. At this time, the kingdom's authorities probably controlled only the western part of the Island of Meroe, and possibly some adjacent land.

According to many modern interpretations of the Aezana inscriptions, the Aksumite ruler conquered Meroe without destroying it (Eide *et al.* 1998, 1100). In this way, the Aksumites controlled the long-distance trade along the Nile, and could easily develop an alternative route by sea.

Patrice Lenoble (1999) pointed to continuity between the Meroitic and the Post-Meroitic periods by comparing

[1] See further http://meroe-project.uw.edu.pl/ [accessed 05/05/2020].

the graves beneath the pyramids at Meroe to those below the largest 'royal' tumuli, dated between the 4th and 6th century AD, located throughout Nubia. Currently, the majority of researchers agree that Meroe met its fate as an organised political power sometime in the 4th century AD, but continued as a concept through the 5th century, perhaps even up to the 6th century.

In conclusion, the decline of the Meroitic Kingdom may be seen on one hand as a process, and on the other hand, as the result of events. The first approach takes into consideration the environment and changes in subsistence economy, which probably started in the late Meroitic period (2nd–4th century AD). The second approach focuses on a shorter period of time, events and changes leading to the disintegration of the Kushite territory into independent kingdoms. This period began around the 4th century AD and finished sometime after the Christianisation of the three Nubian kingdoms in the 6th century AD (Vantini 1975, 6–28).

We do not know much about the early development of the Nubian kingdoms. At the time of Christianisation, the northern realm (Nobadia), with its capital at Faras, probably controlled most of Lower Nubia. The central kingdom (Makuria), with its capital at Old Dongola, covered lands upriver from the Third Cataract. The boundaries of the southernmost (Alwa), with the metropolis at Soba, are the most difficult to set (**Figure 1.3**). In the 6th century, the Nubian kingdoms were in conflict; the Makurian rulers were in opposition to Nobadia and Alwa. Fragments of correspondence between the rulers in the respective capitals of Soba and Faras, are preserved in the accounts of John of Ephesus (Vantini 1975, 17–23); however, the nature of the conflict, the reasons behind it, the progress of events and their duration, are not known.

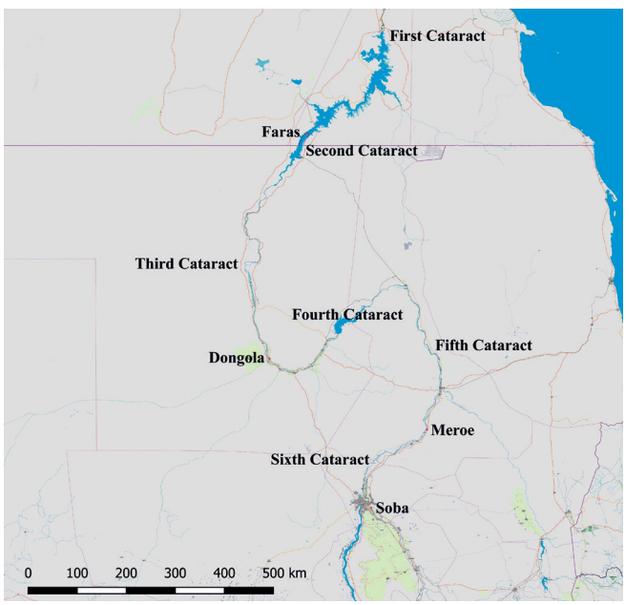

Figure 1.3. Location of the place names mentioned in the text (prepared by Mariusz Drzewiecki, basemap OpenStreetMap)

Fortified sites from the period between the 2nd and 7th century AD in Upper Nubia

The written sources describing political changes in Nubia include only brief and fragmented information about towns, villages and other settlement sites in the region. None of the documents describe any defensive structures in the Nile Valley. This, however, does not fit with that which archaeology has revealed. Through the work of numerous projects, the list of fortified sites dated to the period between the 2nd and 7th century AD is getting longer. Up-to-date information about 36 fortified sites in Upper Nubia built during this period has now been published.

The list is far from being complete. There are still many defences that have been only briefly visited or surveyed. Their detailed chronological sequence is still to be established. In many cases, for now, we know that they were medieval constructions. The question remains, were their walls erected at the very beginning of the period, or sometime later? Concentrations of such fortified sites can be found in the Third and the Fifth Cataract areas. There, on numerous islands and on the banks of the river, defences of various sizes resembling medieval fortifications from the heartland of the Kingdom of Makuria can be identified (**Figure 1.4**).

A similar situation was observed in the Fourth Cataract region; however, as a result of the Merowe Dam Archaeological Salvage Project (2003-2008), most of these architectural remains were investigated. In the majority, the defences were identified as being of the Post-Meroitic/Early Christian period in origin (Żurawski 2014, 135–143).

The list of the 2nd to 7th century AD defences is also not complete because from time to time announcements are made at various conferences about previously 'unknown' fortified sites. These defences, unknown to the scientific community and absent in the literature, usually exist in local knowledge. The residents of nearby villages, in most cases, are aware of such large architectural remains even if they do not associate them with fortifications. The most recent discovery was made in 2015 by the Arizona State University team directed by

Figure 1.4. Medieval defences at the northern tip of El-Usheir island in the Fifth Cataract region, one of the best preserved fortified sites in the region, from the south-east (photo Mariusz Drzewiecki)

Brenda Baker at el-Qinifab in the Fourth Cataract Region (Baker and Schellinger 2017). The remains were well-known to local farmers, who cultivated a palm grove on the site.

Despite many gaps, a total of 36 sites is quite substantial. These defences are scattered throughout the whole of Upper Nubia. This assemblage can form the base for analyses searching for similarities and differences, thus giving insights into the ideas behind the construction of the defences. The first such studies have been conducted already (Drzewiecki 2016a). Using the rank-size rule based on the 'Principle of the Least Effort' (introduced by Zipf 1949), in combination with the hypothesis taken from the Early State Models (first developed by Claessen and Skalnik 1978), four different groups of defences have been distinguished. The variables taken into consideration were the size, layout, construction techniques, localisation of each of the fortified sites, and the spatial organisation of interiors, however, the last factor provided very limited information.

Most of the fortified sites require systematic research to understand the chronological relationship between their internal structures and the fortification. Some, like Banganarti, can provide information on the decision-making behind the construction of the defences, while others allow us to understand later settlement phases, but unfortunately, do not significantly increase our knowledge about the origins of the fortifications (**Figure 1.5**).

Using the variables presented above, the assemblage of 36 fortified sites dated to Late Antiquity was divided into the following types:

Type One

Fortified sites of this type were built along the river and were characterised by an irregular layout (**Figure 1.6**) of massive enclosing walls (*c*. 2m thick or more). In most cases, the line of the walls was adapted to the local topography (**Figure 1.7**) giving the site a position commanding a view of the river; for example, covering the summits and slopes of hills (e.g. Deiga, El-Karmel) or the area between two wadis (e.g. Bakhit) or the summits and slopes of the Nile Valley terraces (e.g. Marakul, Shofein). In general, these sites were not built directly on agricultural lands. The builders usually selected rocky outcrops (e.g. Kuweib) or elevated places difficult to reach with irrigation, where floods were not a direct threat (e.g. Old Dongola), however, there are some exceptions (e.g. Ras el-Gezira). In general, the places were carefully selected to increase defensive potential, enable control over larger areas, and provide the most suitable spot for observation (**Figure 1.8**).

The walls at these sites were built of irregular stone or of mud brick with a stone facing. In some cases, the construction materials from older buildings, such as regular stone blocks, can be identified in the structure of the defences. Curtain walls were substantial, in some

Figure 1.5. Jebel Umm Marrahi, remains of the fort, from the south-east (photo Mariusz Drzewiecki)

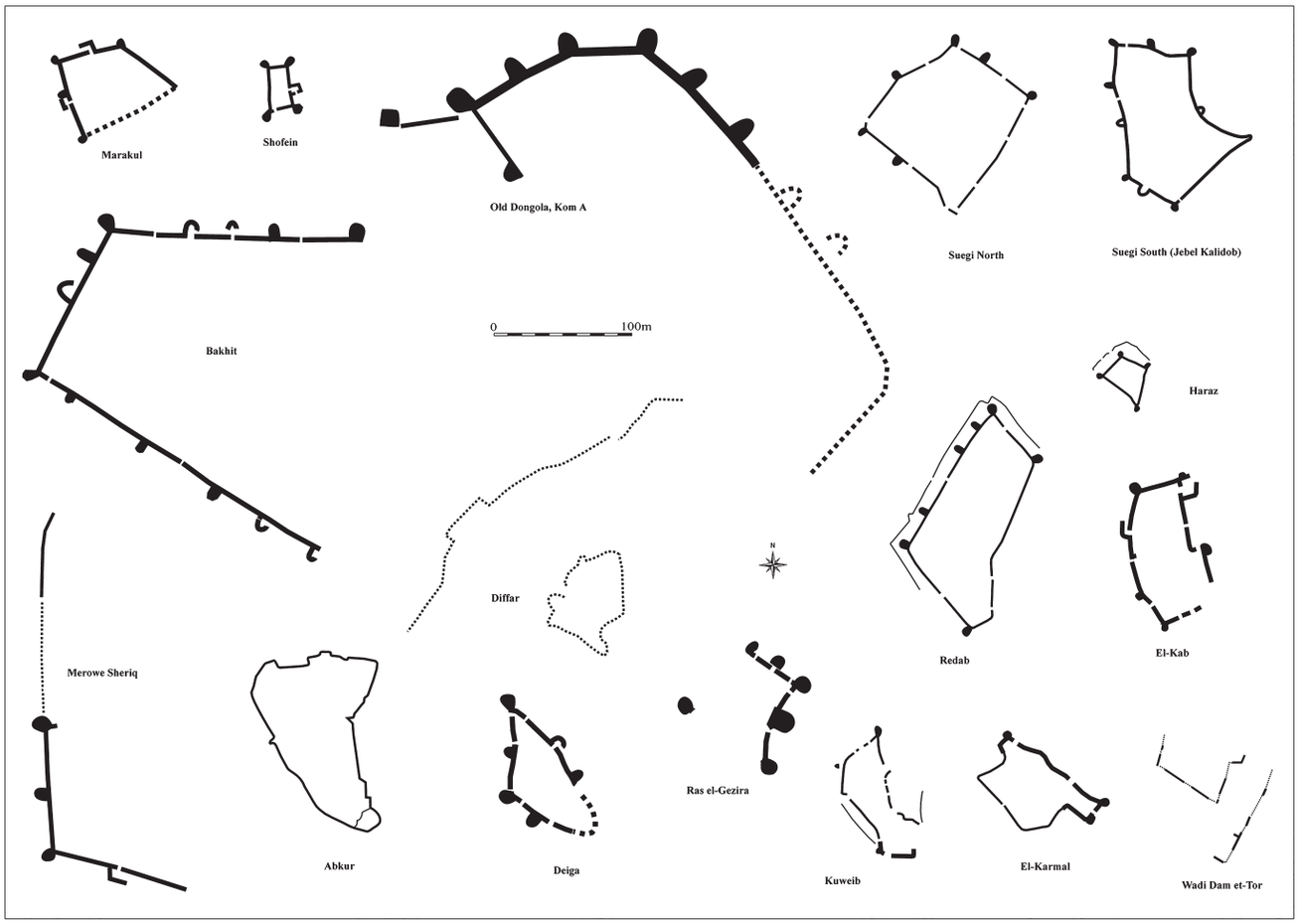

Figure 1.6. Layout and size of Type One fortified sites (prepared by Mariusz Drzewiecki)

Figure 1.7. El-Karmel, the line of the wall built along the edge of a hill (photo Marta Błażejewska)

cases up to four to five metres thick (**Figure 1.9**). In Marakul, the parapet walk is preserved at the top of a few sections of the wall, indicating that the curtain walls were approximately seven metres high. Two flights of stone steps that provided access, were also preserved. They were located next to the gates and were built into the structure of the curtain walls.

The defences of Old Dongola are preserved to a height of roughly nine metres, however, this was the largest of the sites, enclosing the central part of the

Figure 1.8. Fortifications at Marakul, facing west
(photo Aleksander Misiurny)

Figure 1.9. Massive fortifications at Ras el-Gezira
(photo Mariusz Drzewiecki)

capital city. Defences of the less significant sites in the medieval kingdom, such as Bakhit, Deiga and Marakul are preserved, at most, to approximately seven metres (**Figure 1.10**), while the best-preserved examples of early medieval defensive architecture in the Fourth Cataract and further upstream along the Nile were, or are, standing five to six metres high.

The enclosures usually had two or more gates, some with additional defences. To slow down a potential assault on the gate, various solutions were implemented, however, the most common was to create a bent passage by means of a L-shaped wall or via the more complex solution of a tower-gate (**Figure 1.11**). Sometimes additional walls and towers/bastions were built next to the gate to increase the security at the approach to the entrance.

The corners of the enclosures and the longer lines of curtain walls were also, in many cases, strengthened with towers/bastions. On some sites, they were located at regular intervals, for example midway between the

Figure 1.10. Well-preserved curtain wall at Bakhit
(photo Mariusz Drzewiecki)

Figure 1.11. Gate at Shofein (photo Aleksander Misiurny)

corners, but in many cases, this symmetry was not kept and some curtain walls could have had more towers/bastions than others (e.g. Marakul). They were of various shapes: semi-circular, semi-elliptical, horseshoe or quadrilateral in layout. It is not uncommon to find that different types of towers/bastions and gates were employed on a single site (e.g. Suegi S).

The fortifications of Type One can be seen in Upper Nubia from the Third to the Fifth Cataract region (**Figure 1.12**). Upriver from Berber, such sites have not been reported. This, however, could be the result of less frequent surveys in combination with the extensive agricultural and urban development of the region which might hinder the identification of even large sites.

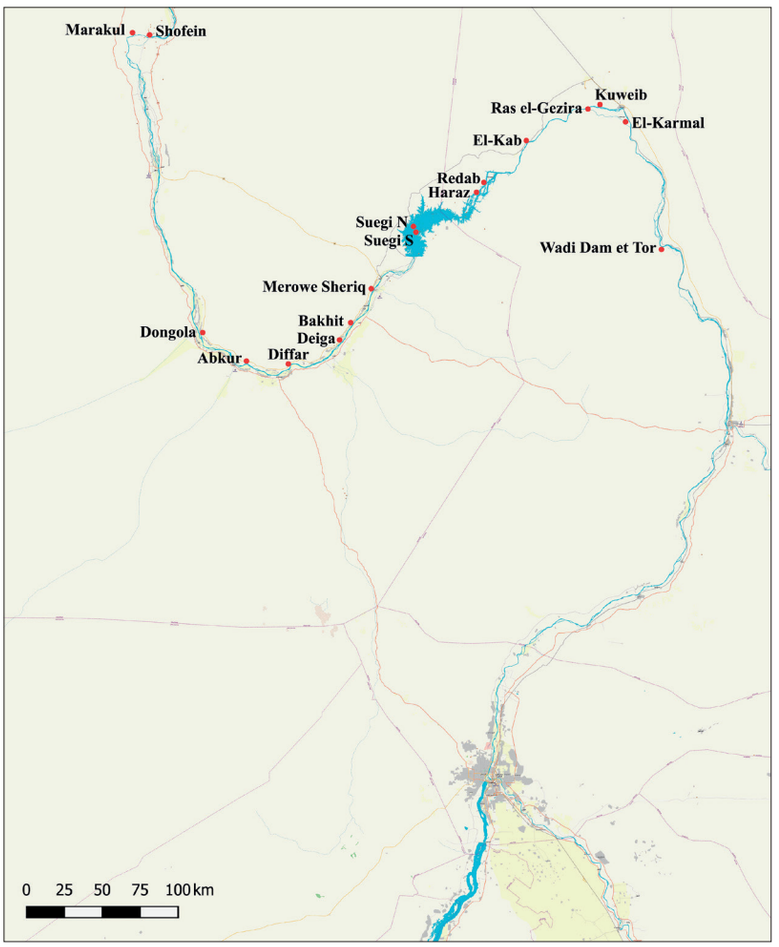

Figure 1.12. Location of Type One fortified sites
(prepared by Mariusz Drzewiecki, background image OpenStreetMap)

Concentrations of the Type One fortifications are observed in:

– The Third Cataract: however, only Shofein and Marakul can be conclusively dated to the Post-Meroitic/Early Christian periods, the rest of the sites still require systematic fieldwork (Osman and Edwards 2012; Łopaciuk *et al*. 2014);
– The Southern Dongola Reach (Wiewióra 2003): Old Dongola (Post-Meroitic), Abkur, Diffar, Deiga, Bakhit (Post-Meroitic/Early Christian), Merowe Sheriq (Post-Meroitic);
– The Fourth Cataract Region (Żurawski 2014; Wiewióra 2007): two fortified sites on opposite banks of the Nile at Suegi (Post-Meroitic), Haraz, Redab, El-Kab (Early Christian);
– Mograt Island and the surrounding area (Näser 2008; Rees *et al*. 2015, 179, 183): Ras el-Gezira, Kuweib, El-Karmel (Early Christian);

Further south this type of fortified sites is also present, especially in the Fifth Cataract Region, however, their precise chronology has not yet been established.

Type One fortified sites between the Third and the Fourth Nile Cataracts are associated with the Kingdom of Makuria. The capital at Old Dongola had the most extensive fortifications in the region. The earliest defences at Kom A were built in the Post-Meroitic period (Godlewski 1997). From the beginning, they were designed to be monumental in scale and can be considered the biggest man-made structure in the Dongola Reach (enclosing an area of 39,367m^2). The defences were built to protect the developing Kingdom of Makuria. They could also have served as a symbol dominating the landscape and as a visualization of the king's rule over the land. Fortified sites located in the Southern Dongola Reach were in general characterised by large dimensions in comparison to sites at the Third and Fourth Cataracts. Shofein, located in the Third

Cataract region, is the smallest Type One site (with an area of 387m²).

The question arises as to who built Type One fortified sites upriver from the Fourth Cataract. This needs to be considered very carefully as the borders of Makuria and Alwa had not yet been established. Throughout the medieval period, the situation most probably was dynamic. The written sources provide us with the succinct information that in the 10th century both kingdoms were united (Welsby 2002, 89). In the late medieval period it is difficult to identify an entity called El-Abwab, that begins to be a major force in the region. Was this just a different name for Alwa, or the northernmost province of the kingdom, or was it an independent realm?

Likewise, little is known about the early medieval territorial extent of Makuria and Alwa. How had these kingdoms developed? How did they take control over the land? Written sources can provide some insights, suggesting that during the Christianisation of Alwa in AD 580, there were tensions between the rulers of Dongola and Soba. In this context, a chain of fortified sites could have been a means to establish authority over the land.

The situation was probably complex, while the data on the fortified sites comes from varied, but usually brief research, mostly archaeological surveys and trial excavations. In addition, upriver from the Fourth Cataract next to the irregular fortified sites (Type One), is a group of highly regular stone forts that are also generally dated to a wide time span, between the 2nd and 7th century AD. These forts constitute Type Two in this typology.

Type Two

These forts are roughly rectangular with bastions in every corner and with one or two gateways (**Figure 1.13**). The bastions were in most cases round, but a few examples of rectangular structures are known from the

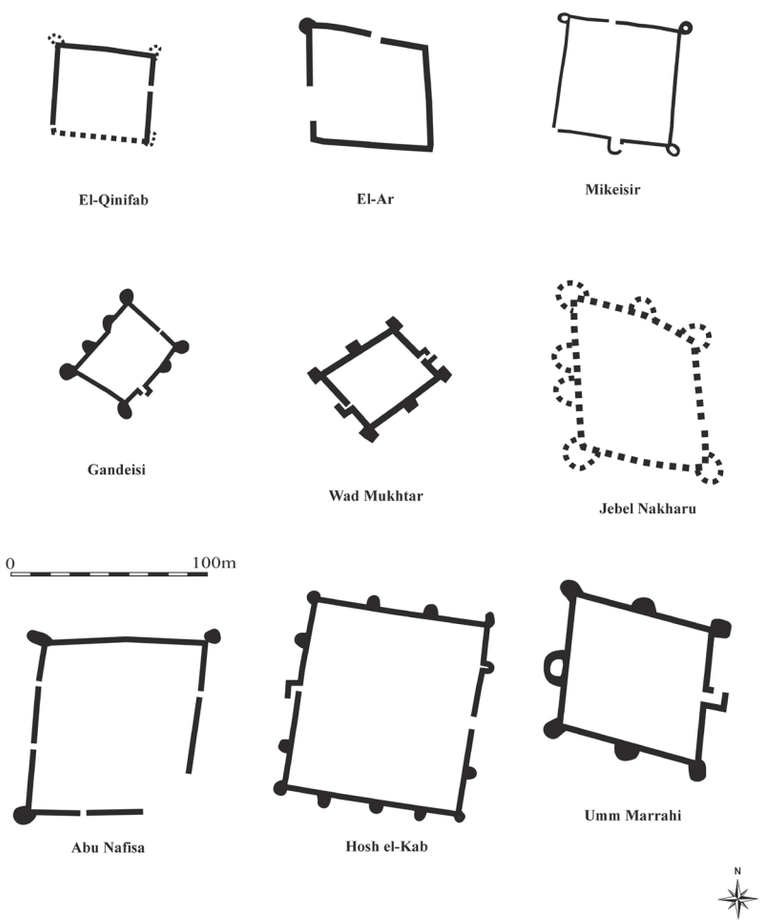

Figure 1.13. Layout and size of Type Two fortified sites (prepared by Mariusz Drzewiecki)

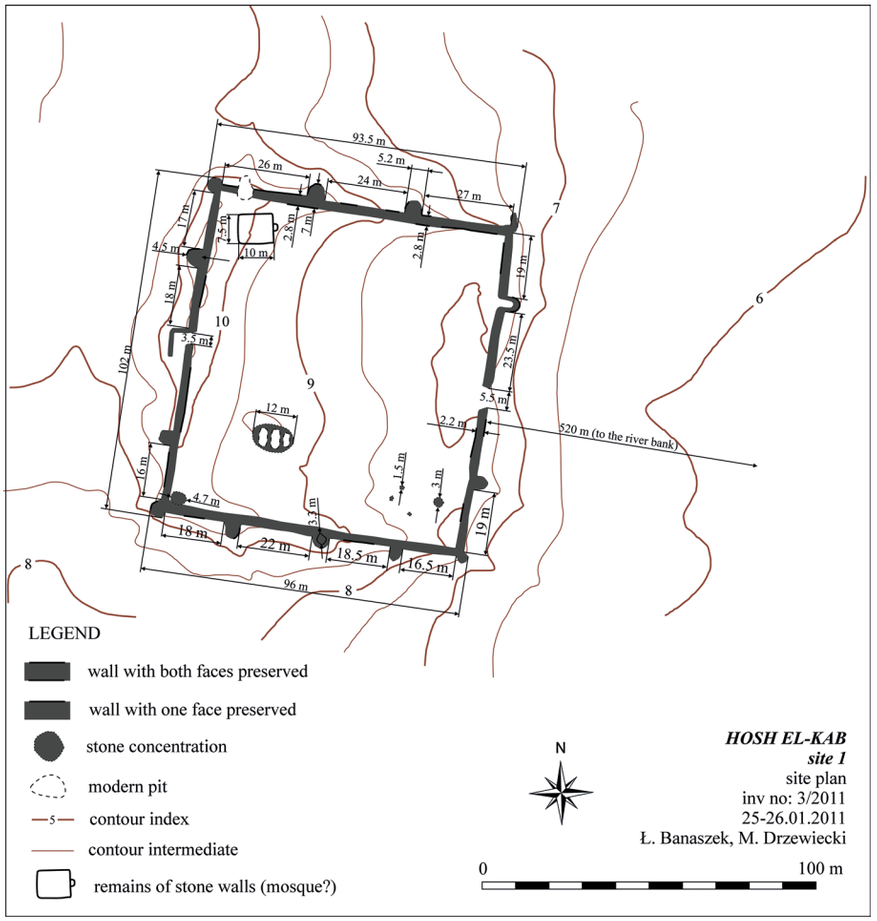

Figure 1.14. Hosh el-Kab, plan of the fortifications
(prepared by Mariusz Drzewiecki and Łukasz Banaszek)

Figure 1.15. Wad Mukhtar, the fort in the distance, facing east
(photo Paweł Polkowski)

southern fringes of the region (Wad Mukhtar and Jebel Umm Marrahi). The gates were most often provided with additional defences creating an L-shaped bent entry passage. In some of the forts, bastions were located along the walls to strengthen the line of defence. These were usually single features midway between the corners, although one example is known from Hosh el-Kab, which altogether has 13 bastions (**Figure 1.14**): four on the corners, two along each of the west, north and east curtain walls and three bastions along the south curtain wall. Hosh el-Kab is the biggest of the regular forts, enclosing *c*. 7,867m². Wad Mukhtar is the smallest with *c*. 1,913m² area inside (**Figure 1.15**).

When compared with Type One, these forts seem to be much more uniform in terms of their size. Old Dongola (the largest of Type One) is approximately 36 times bigger than Shofein (the smallest of Type One), while Hosh el-Kab (the largest of Type Two) is roughly four times bigger than Wad Mukhtar.

Some of these forts also show an unusual pattern of wall construction that has not been detected in defences of other types. The stones in the wall faces were placed in rows in an upright position, creating vertical masonry (**Figure 1.16**). This type of construction technique has been noted at medieval and later sites, but they were also used in foundations (the so-called *ala seifun* – 'on their swords' in Shinnie 1961, 18), or as a single row to level the brickwork (Drzewiecki 2011, 276–278). Vertical masonry noted in the forts seems to be used on a much wider scale. For example, Mikeisir was built mainly with this technique. In forts at El-Ar, Gandeisi and Jebel Nakhara, large parts of the wall faces have this vertical stone facing.

At first glance, the space inside the forts seems empty or filled with more recent remains. The surface of the ground usually is covered with architectural remains which cannot be directly associated with Late Antiquity. Pottery sherds documented in the course of surface surveys mostly represent a wide chronological range, and include medieval and post-medieval materials. This is probably the result of reuse of the enclosures. The Mikeisir fort, where excavations were conducted by Claudia Näser and her team, is exceptional in this respect (Rees *et al*. 2015, 184–193). The researchers discovered regular mud brick architecture built against the inner face of the curtain wall. The buildings were made from less durable materials that survived to the present thanks to an accumulation of sand and the abandonment of the site. It seems that in later periods other fortifications on Mograt Island attracted more attention, with the best example being the El-Karmal fortified hilltop site which was still inhabited during Frédéric Cailliaud's visit in 1821 (Cailliaud 1826, 183–190).

Figure 1.16. Mikeisir, vertical masonry in the construction of the curtain walls (photo Marta Błażejewska)

The best-preserved walls of the forts stand approximately three metres high at present. Traces of pavements were documented along the top at Jebel Umm Marrahi and Gandeisi, indicating the presence of a parapet on the walls. The original height of the defences at Jebel Umm Marrahi was estimated to be around 3.5 metres (El-Hassan 2006, 33). The thickness of the Umm Marrahi curtain walls ranges between three and four metres. The thickness of the walls at other sites was comparable, between two and four metres. This might suggest than the height of the defences could also have been similar, ranging between three and four metres.

The Middle Nile Valley forts share similarities and resemble Roman type small forts built throughout the Empire in Late Antiquity (Lander 1984; Kennedy and Riley 1990; Le Bohec 1994). The closest parallels can be found in the Eastern Desert of Egypt (Sidebotham *et al*. 2008, 355). There, the forts were built along the routes crossing the inhospitable lands, and to guard the mining sites. Michel Reddé suggested that the fortlets guarding the mines and routes constituted two different types (Reddé 2018, 3–5). The Middle Nile forts resemble the *praesidia* on two routes, one from Coptos to Myos Hormos, and the second leading from Coptos to Berenice. Most of these forts were built between the 1st and 4th century AD.

A list of all currently known Middle Nile Valley forts dated to this period is presented below. The list is not definitive (**Figure 1.17**). On the one hand, new discoveries are being made constantly in the region, while on the other hand, some forts were only surveyed

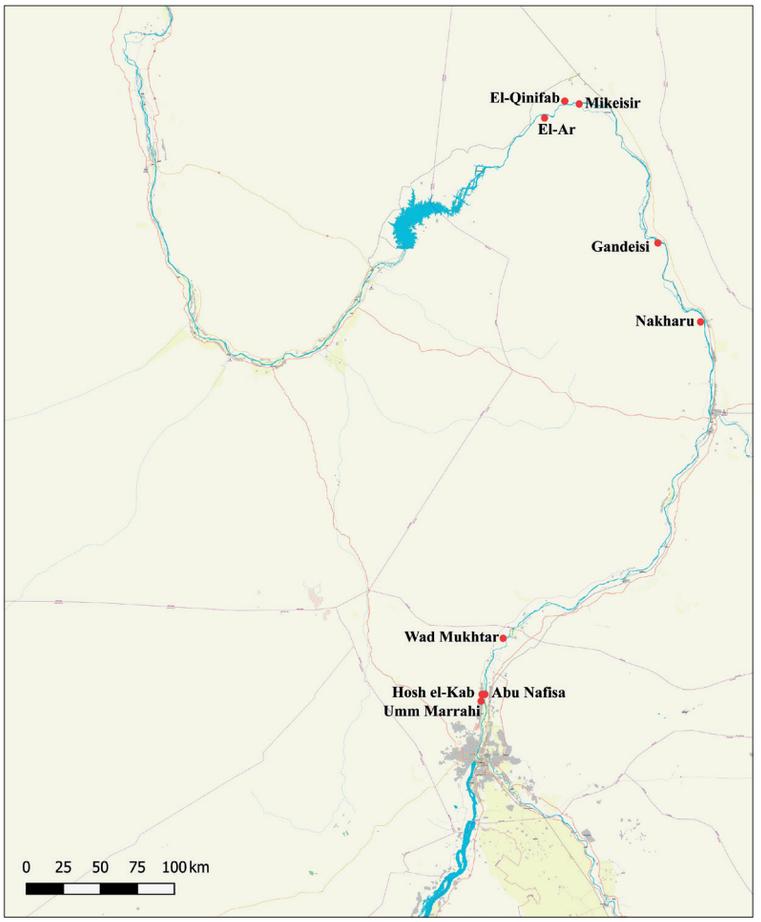

Figure 1.17. The location of Type Two fortified sites (prepared by Mariusz Drzewiecki)

and require more substantial fieldwork. The list currently includes the following defensive structures:

– El-Ar – located in the Fourth Cataract region, a short distance from Shemkhiyya village. Its origins have been dated to the Post-Meroitic period on the basis of the analysis of pottery recovered from a context in the first phase of the defensive structure (Żurawski 2010a, 202);
– El-Qinifab site ASU 15-13 – locally known as El-Hosh, and located in the Fourth Cataract region. The site is the most recent discovery (2015) made by the Arizona State University Bioarchaeology of Nubia Expedition (ASU BONE) directed by Brenda Baker (Baker and Schellinger 2017);
– Mikeisir – built on Mograt Island. Its beginnings have been dated to the Post-Meroitic period on the basis of radiocarbon dating of samples from settlement layers surrounded by the defensive walls. Small finds have been dated generally to the late Meroitic and Post-Meroitic periods (Rees *et al*. 2015, 192–193);
– Gandeisi – at the north edge of the Fifth Cataract region. In terms of architecture, the structure is similar to the forts at El-Ar, Mikeisir and Jebel Nakhara. The site has been identified as medieval on the basis of materials collected from the surface. In addition, stone blocks have been found in one of the corners. According to O. G. S. Crawford, these came from a Meroitic building whose location is currently unknown (Crawford 1953a, 30);
– Jebel Nakhara – upstream of the Fifth Cataract, opposite Dangeil; O. S. G. Crawford dated the site to the Meroitic period on the basis of analogies with the fort at Jebel Umm Marrahi. During the Berber-Abidiya survey, pottery dated from Post-Meroitic to Islamic was recorded in the fort (Anderson and Mohammed Ahmed 1998–2002, 30–31). Pottery

artefacts collected during the most recent survey indicate a medieval chronology of the site (Jesse *et al*. 2013, 68);

– Wad Mukhtar – located at the north end of Sabaloka Gorge. It is dated to the late Meroitic/Post-Meroitic periods on the basis of pottery collected from the surface (Drzewiecki and Polkowski 2016, 81);
– Abu Nafisa – approximately halfway between the Sixth Cataract and the confluence of the Nile. The site is mentioned by Derek Welsby (2014, fig. 6) as belonging to the series of forts erected by the rulers of Alwa at the beginning of the kingdom;
– Hosh el-Kab – located *c*. 500m from Abu Nafisa. It is dated to the late Meroitic/Post-Meroitic periods on the basis of pottery collected from the surface (Lenoble 2006, 131);
– Jebel Umm Marrahi – the southernmost fort. It is dated to the late Meroitic/Post-Meroitic/Early Christian periods on the basis of pottery collected from the surface and recovered from excavations conducted in 1977–1978 (Crawford 1953a, 39; Hakem 1979, 155; El-Hassan 2006).

There are other sites that might also be regular forts, however, they lack published documentation, or the available information is extremely brief, and so it was not possible to include them in the list. Four such sites need to be mentioned in this context: Abu Mereikh C (El-Amin and Edwards 2000; Drzewiecki and Stępnik 2014, 103), El-Usheir South (El-Amin and Edwards 2000, fig. 9), Mutmir (Welsby 2014, 188–190) and Nadi (Żurawski 2015, fig. 11).

The forts were erected on the banks of the river and islands stretching from the Fourth Cataract to the region of the confluence of the White Nile and the Blue Nile. This area covered *c*. 550km of the Nile Valley, flanking the Butana heartlands of the Meroitic Empire. In the early medieval period, this was the region where the Kingdoms of Alwa and Makuria met in the Nile Valley.

Type Three

This type is a combination of the two previous groups and they were built later, during the Early Christian period. The defences are of regular shape (**Figure 1.18**). They were quadrilateral in layout, but

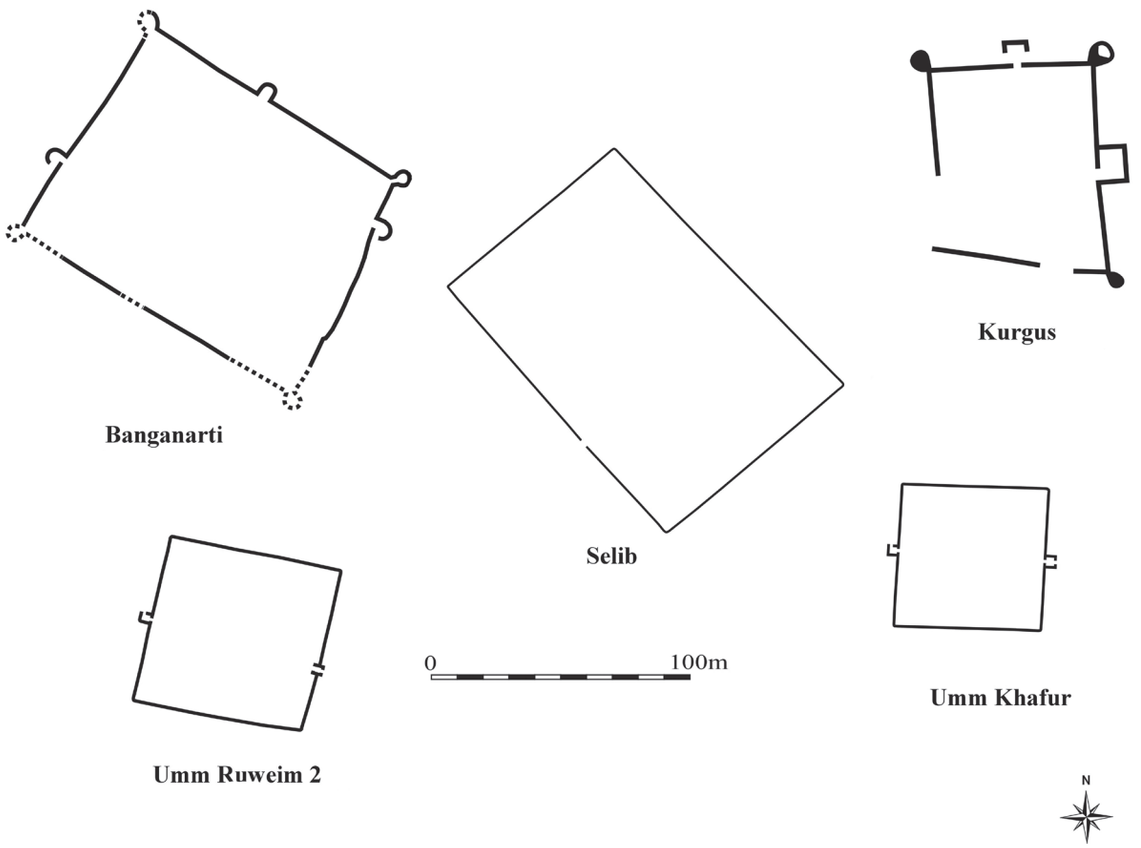

Figure 1.18. Layout and size of Type Three fortified sites
(prepared by Mariusz Drzewiecki)

Figure 1.19. Remains of the gate of the enclosure at Selib (photo Mariusz Drzewiecki)

Figure 1.20. The curtain wall in Banganarti built with mud brick (photo Mariusz Drzewiecki)

this is where the similarities with Type Two end. Irregularities can be observed in the locations of bastions and gates. Some Type Three defences originally might have had towers, while Type Two sites are relatively low and only had bastions. In Type Three fortifications, some corners are left without any additional defensive features (e.g. Umm Ruweim 2, Umm Khafur) and gates may have the structure of a simple opening in the curtain wall, without any extensions to hinder the approach to the entrance (e.g. Selib – **Figure 1.19**).

There is a greater diversity of construction materials used, e.g. the fortifications at Banganarti were built of mud brick (**Figure 1.20**) while at Selib the lower parts of the walls were constructed of stone and the upper parts of mud brick, whereas Umm Khafur was built of stone.

Type Three structures can be found in the Nile Valley, as well as at a considerable distance from the river. It seems that they fulfilled a variety of functions: for instance, Banganarti and Kurgus extended their protection over populated settlements. In both cases, the space enclosed by walls was covered with densely packed remains of buildings, connected to the gates by means of narrow streets. The closest parallels to these sites are the fortified settlements created in the Early Christian period in Lower Nubia at Sabagura, Sheikh Daud and Ikhmindi (Welsby 2002, 129–130). Structures of Type Three located in the desert were founded along frequently travelled routes (i.e. at Wadi Abu Dom). Banganarti and Selib also functioned as places of worship, with churches in the centre of the enclosures, whereas Selib might have served as a refuge for the people from the large, open settlement documented nearby (Żurawski 2016, 93).

The following defences should be regarded as type three structures: Banganarti, Selib, Umm Khafur, Umm Ruweim 2 and Kurgus (**Figure 1.21**). The first four were built in the territory associated with the Kingdom of Makuria. Kurgus, according to Derek Welsby (2014, 188), might have been the northernmost settlement founded by the rulers of Alwa, however, the small finds, especially the mud stoppers, connect the site more with Dongola (Dzierzbicka, in preparation).

There are also other fortified sites that could be associated with Type Three, but their chronological sequence needs to be studied in more detail. One of these sites is Abu Sideir (**Figure 1.22**), mentioned by Derek Welsby (2014, fig. 6) as belonging to the series of forts erected by the rulers of Alwa. There is also a site called El-Kuwieb (KE-36-2A) at El-Ga'ab which remains yet

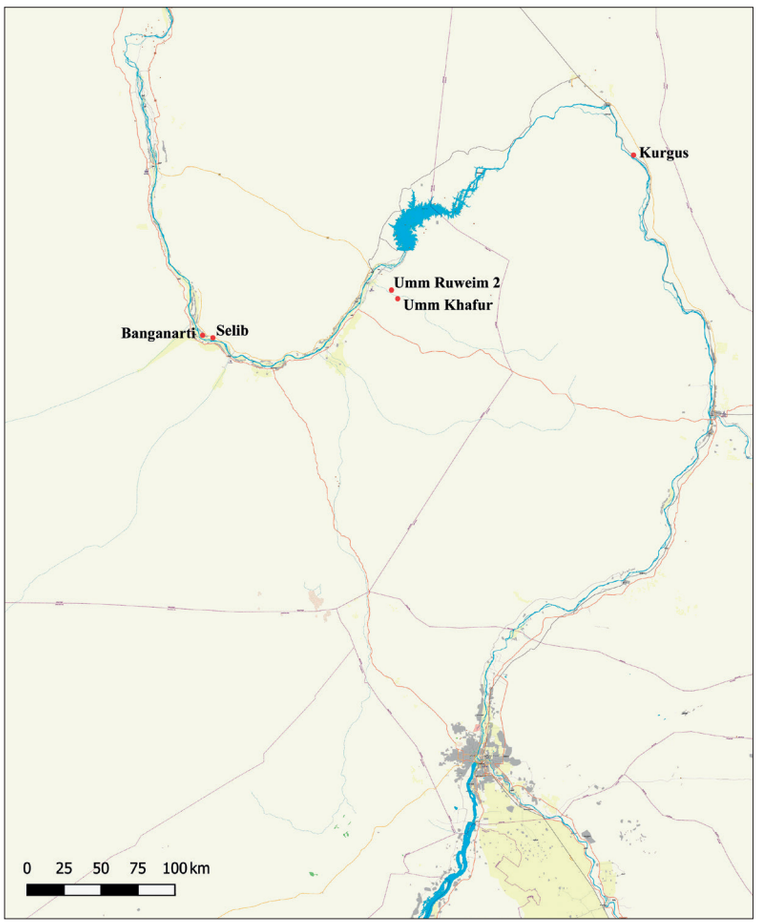

Figure 1.21. Location of Type Three fortified sites
(prepared by Mariusz Drzewiecki)

another puzzle to be solved. This was documented by the University of Khartoum mission, headed by Yahia Fadl Tahir (2013, 129). Its chronology has not been established owing to an absence of diagnostic features among the materials collected from the surface. Architectural analysis of KE-36-2A is also a task for future research since much of the architecture is covered with stone debris.

Type Four

Areas farther away from the Nile contain another type of enclosure, which is characterised by casemate wall construction. These have been located at opposite ends of the Bayuda Desert at Umm Ruweim 1, Umm Kuweib (Chittick 1955; Eigner and Karberg 2011; 2012; Lohwasser and Karberg 2020) and Hosh el-Kafir (Lenoble 2006), and all date to the late Meroitic period (**Figure 1.23**). Casemate walls are a good solution to promote the efficient use of construction materials. Instead of solid walls, large parts of the core of the wall are left open, creating in all three of the aforementioned examples, long and narrow chambers parallel to the axis of the curtain walls (**Figure 1.24**). The walls are less durable, but can be built in a shorter period of time or by a smaller number of people. In the areas away from the river, this might have been the main reason behind the implementation of such a construction technique.

The casemate walls provided additional space for utilitarian exploitation within the curtain walls. As a result, elongated, closed spaces, two metres wide and more than ten metres long, were formed. Their long walls were approximately one-metre-thick, and the short, dividing walls were thinner. Casemate rooms, in all examples, were entirely built from stone. In this way, they differ from the rows of chambers built against the inner faces of the Nile Valley forts, such as

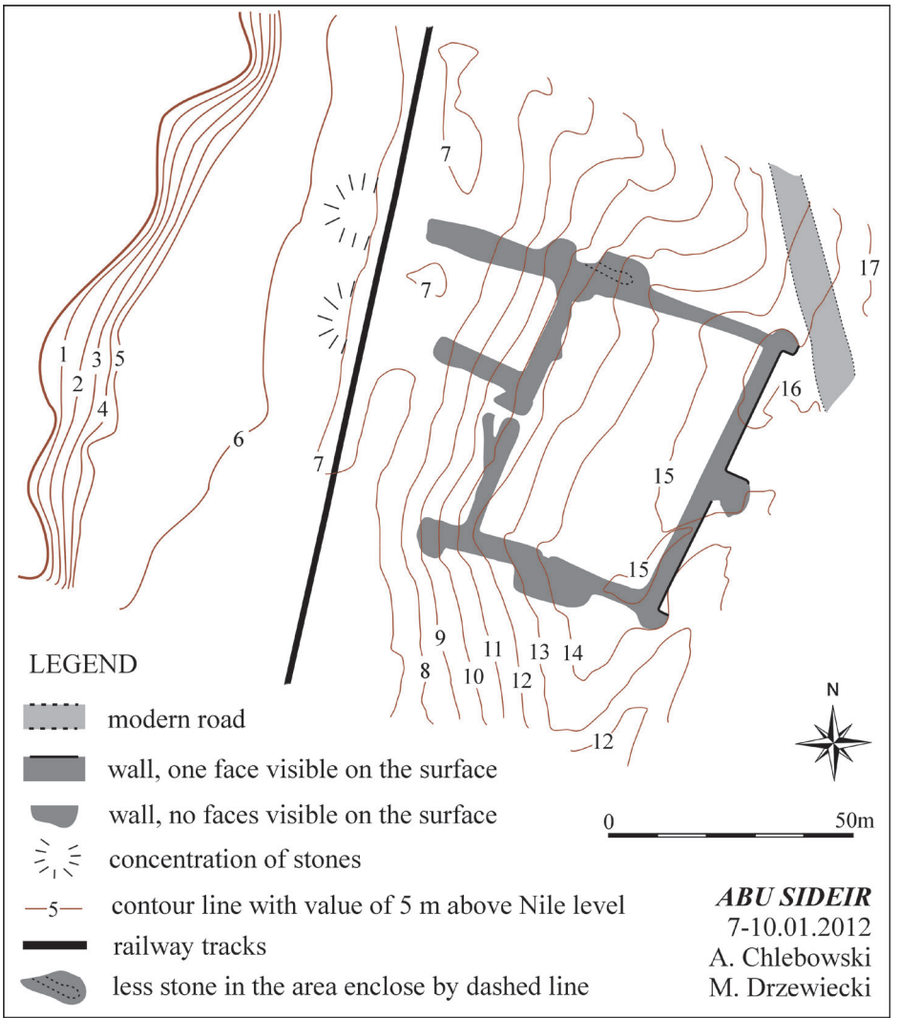

Figure 1.22. Plan of fortifications at Abu Sideir
(drawn by Adrian Chlebowski and Mariusz Drzewiecki)

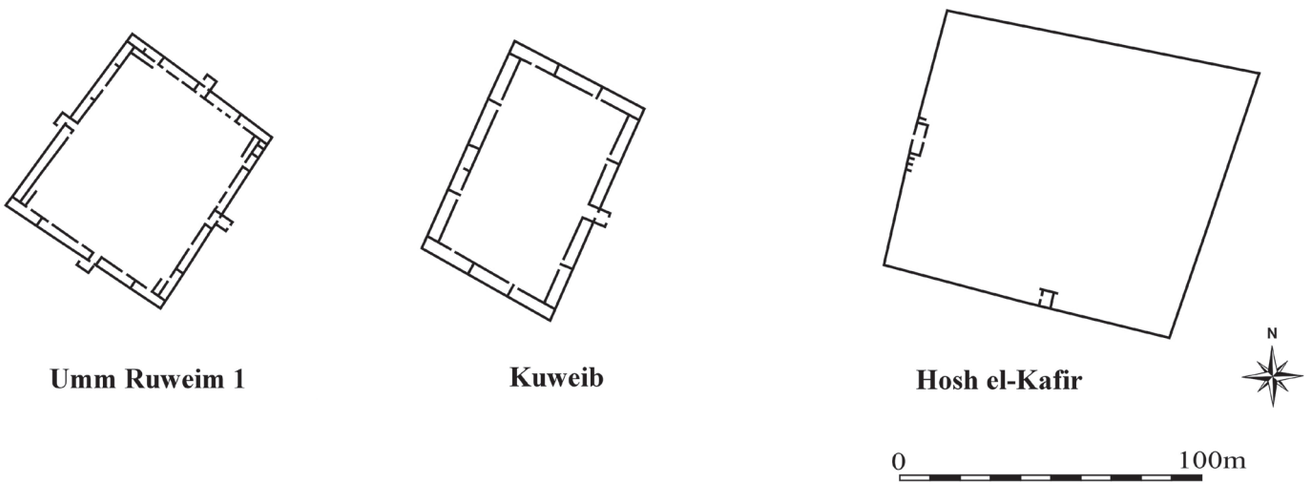

Figure 1.23. Layout and size of Type Four sites
(prepared by Mariusz Drzewiecki)

Figure 1.24. Aerial photograph of Umm Kuweib, facing south-east (courtesy of Henryk Paner; taken by Marcin Szmit, Adam Kamrowski, Damian Ciesielski)

at Mikeisir (Type Two). In the Mograt Island fort, the enclosure wall was built of stone, while the walls of the buildings within were much thinner and constructed of mud bricks.

It appears that casemate walls in Upper Nubian sites were not very high. The presence of ramps and low stairs at Umm Ruweim 1 suggests that the curtain walls were not much higher than the chambers. The massive long walls were definitely strong enough to support the weight of a parapet walk. For this reason, casemate enclosures might have appeared to observers seeing the site from a distance as low, massive structures, with approximately four-metre-thick curtain walls equipped with parapet walls on the top. In this way they resemble the Type Two forts, which were also relatively low and massive structures.

Type Four enclosures could have fulfilled a number of functions (Eigner 2018). A religious role was suggested by Dieter Eigner (Umm Ruweim 1) and Patrice Lenoble (Hosh el-Kafir). At the same time, the administrators of these centres might have supervised long-distance trade throughout the Bayuda. Their function could have been similar to that of modern caravanserai according to Mahmoud el-Tayeb (pers. comm.). The sites might have functioned as stops at the ends of a trail that crossed the desert. Situated at a certain distance from permanent settlements in the valley, they might have been points where people gathered and prepared animals and loads for departure.

The narrow gates of these complexes were not well-adjusted for busy traffic, and thus it could be assumed that the enclosures might have functioned as landmarks that were easy to distinguish in the landscape of the Bayuda, and indicated the meeting point. Analogical behaviour can be witnessed even today. Nomads rarely enter settlement areas. Their final 'stop' normally is situated at the edge of densely populated territories. This is the place where they exchange goods, as for example in the modern camel markets on the outskirts of Omdurman or ed-Damer. After the exchange, which can last for several days or longer, the desert people turn around and leave the area. Wells in the bed of the Wadi Abu Dom, as well as the numerous small dams in the vicinity of Hosh el-Kafir, could have provided water for larger populations of nomads during such a short time.

In this context, enclosures on the edges of the Bayuda might have been the places where taxation could have been imposed on the traders. Owing to the fact that there was no official monetary exchange in the Middle Nile Valley at that time, it can be assumed that the enclosures might have been used at least for the temporary storage of goods that constituted such payments. This would explain the narrow gates and parapet walls as the means to protect the goods, and the elongated casemates as storage space.

Derek Welsby suggested that the so-called 'Western Palace' at Faras is similar to the enclosures in the Bayuda Desert (Welsby 2005, 49). The Western Palace was located *c.* 1.5–2km from the Nile Valley at the edge of Faras, which prospered as early as in the Meroitic period. The Palace housed, amongst other things, ostraca interpreted as inventories with lists of goods, suggesting, among its other uses, a storage function.

In summary, the typology presented above is built on information derived from 36 fortified sites that are dated to the period between the 2nd and 7th centuries AD. Despite the lack of references to fortifications in the written sources, it seems that they were part of the strategies implemented by various rulers and kingdoms to control and protect the land, and to display their power.

The sites have been divided into four types based on similarities in size, layout, location, construction technique and organisation of interior space. The Type One and Type Three sites were most probably built by the rulers of the medieval kingdoms. Type Four, enclosures with casemate walls, could be associated, among other uses, with long-distance trade at the time before the emergence of Makuria and Alwa. Type Two, the regular forts, are the most unified group, and the most problematic to interpret. They link 550km of the Middle

Nile Valley between the Fourth Cataract and the confluence of the Niles. Detailed analysis of this group may bring new insights into the power struggles, the end of Meroitic authority in Upper Nubia, and the development of the Nubian realms. It is for this reason that this latter group constitutes the main research focus of this study.

Who built the Type Two forts and potential answers?

If each of the sites was erected by a different local ruler, then the forts would have a more individual character. A large organisation would be required to facilitate the enterprise, as well as authorities that wanted to use the land and control the movement of people.

The area where these forts have been noted was the heartland of the Kushite Empire during the Meroitic period. This probably was the region where Meroitic power survived the longest. It is possible that the forts were built during the last centuries of the empire to control what remained under the Kushite authority. Did the Meroitic rulers build forts to protect their centre of power?

In the Post-Meroitic and Early Christian periods, the area witnessed the rise of the Nubian kingdoms, but their territorial development is far from being understood. Perhaps the Alwan or Makurian kings decided to create the net of defences in the area and if so, then which sites were built by which ruler, and what were the reasons for doing so?

The only person thus far, who has sought answers to these questions is Derek Welsby. In his book *The Medieval Kingdoms of Nubia*, he wrote that there are regular fortified sites between Abu Hamed and the confluence of the Niles (Welsby 2002, 132, 161). He compared them to the fortified settlements in Lower Nubia that developed during the Early Christian period. A stela from Ikhmindi in Lower Nubia explains that the defences in the region were built by Tokiltoeton, King of the Nobadae, to protect men and beasts of burden (Donadoni 1959). It was dated to the 7th century. Based on this analogy, Welsby suggested that a system of similar defences also developed farther south in the Kingdom of Alwa, and he listed four sites: Kurgus, Jebel Nakhara, Abu Nafisa and Jebel Umm Marrahi.

In 2014, Welsby again wrote about the fortifications of Alwa and listed eight sites: Kurgus, Abu Sideir, Jebel Nakhara, Mutmir (**Figure 1.25**), Wad Mukhtar, Abu Nafisa, Hosh el-Kab and Jebel Umm Marrahi (Welsby 2014, 188–190). Kurgus was to be, at least for some period of time, the last Alwan fort in the north, and thus the border between the Kingdoms of Makuria and Alwa. Welsby's list included many sites which may be categorised as having Type Two defences. However, Abu Sideir and Kurgus are Type Three sites, and Welsby did not include El-Ar (**Figure 1.26**), Mikeisir and El-Qinifab. Reports concerning the chronology of Mikeisir and El-Qinifab were published after 2014, so Welsby did not have access to information about these sites. The architectural remains of Abu Sideir had been newly mapped indicating they should be associated with the Type Three enclosures, combining the features of irregular (Type One) and regular (Type Two) sites (Drzewiecki and Stępnik 2012).

The situation with Kurgus is similar, but in this instance extensive fieldwork has been carried out there.

Figure 1.25. Mutmir fort (Google Earth)

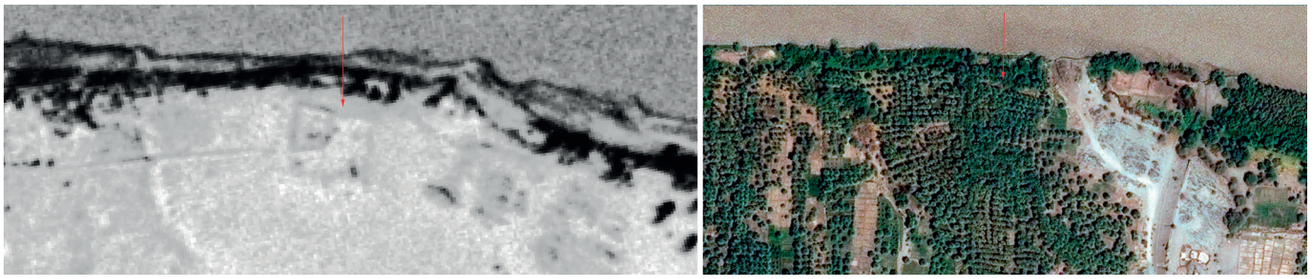

Figure 1.26. Location of El-Ar fort; left – Corona photo from 1972; right – Google Earth image from 2018

Beginning in the 1990s, Kurgus was the focus of several archaeological fieldwork campaigns and a detailed description of the defences is thus available. The foundations from the river side were made of irregular stones, approximately to the height of one metre. The surviving upper sections were of mudbrick. The eastern curtain wall was made of mudbrick only. In later occupation periods some stone additions were made. No large-scale use of vertical masonry was reported. The walls reached five metres in thickness and in the best preserved sections, they may be standing four to five metres high. The site was investigated in 1998, 2000, 2002, 2004 (Welsby Sjöström 1998; 2001; 2003; 2008; 2014) and again in 2014 and 2015 (Haddow and Nicholas 2014; Ginns 2015). During the 2000 season, Post-Meroitic pottery was reported under the foundations of the eastern curtain wall. The occupation of the fort was dated to the Christian period (Welsby Sjöström 2008, 98; 2014, 130). During the 2014 and 2015 research, the fort was estimated to have been in use from Early Christian times onwards, until the end of the medieval period (Weschenfelder 2015, 139).

It appears that the walls at Kurgus were higher than the curtain walls found in Type Two forts. The combination of stone and mud brick resembles that used in Selib in the Southern Dongola Reach. The construction of the gates is also interesting. They were much larger, constituting most probably tower gates, and not simple passageways with L-shaped walls so common in Type Two forts. In conclusion, a later chronology (from the Early Christian period onwards) and the differences in the construction of fortifications are the reasons why Kurgus is included in the Type Three enclosures.

The hypothesis of an Alwan chain of forts needs to be considered, but for now it leaves many open questions. The fundamental question is: when was the building of such a system initiated – during the Post-Meroitic period, or in Early Christian times? The second issue concerns the organisation of the system of forts. Was there a system at all? Why was only the northern part of Alwa fortified? In the Lower Blue Nile and the White Nile regions no medieval fortifications have been reported. The capital at Soba was not equipped with a line, or lines, of defences. There were three forts built just 50km from the capital (Jebel Umm Marrahi, Hosh el-Kab and Abu Nafisa). Why then was Soba itself not reinforced with fortifications?

The explanation for the presence of regular forts in the region might be that the building of the line of forts was initiated during the late Meroitic period, and afterwards, was reused and developed by the Alwan rulers. This would explain the location of defences only in the northern part of the realm. The chain of forts connected the heartland of Meroe with the Korosko-Abu Hamed route in the north, and with the confluence of the Nile in the south, covering strategic trade routes from the point of view of the central Meroitic authority.

Similarities with Roman small forts would also be easier to explain since their period of construction and occupation would overlap. The Roman forts in the Eastern Desert were built in the 1st to 4th century AD. The late Meroitic falls into the second part of this period. Well-established contacts between the Meroitic elites and the Roman world would make it easy to acquire specialists, or knowledge of the construction of these defences. On the whole, the hypothesis of the forts' beginnings in the late Meroitic period seems to fit well.

However, not everything is so easy to explain. The distances between the forts are not regular, and we probably do not have the full picture. Some forts may have been destroyed, or are now covered by modern towns and villages, industrial facilities or agricultural areas. However, the three southernmost enclosures are next to each other, whilst those at Wad Mukhtar and Jebel Nakhara are separated by a distance of *c*. 290km

along the Nile. Even acknowledging that some forts might still await discovery, the differences in distances are too extreme.

Maybe this group of forts does not constitute a system at all. Perhaps they were built in response to a conflict or a threat, and not as a planned investment in the safety and trade of the region. The builders, for example, could erect the defences at sensitive points close to changing boundaries, or in anticipation of the movement of an opponent's forces.

The second possibility is that the forts built next to, or near each other, are not of the same period. Perhaps only one was in use at any one time, while the others were already in ruin or were yet to be built. In this context, the relationship between Type One and Type Two defences is interesting. There is a spatial connection – a territorial overlap in the Abu Hamed Reach and in the Fifth Cataract region. Type One and Type Two sites identified in those regions are not far from each other. While the cataract is still an area that lacks long-lasting systematic research, an example from Mograt Island is worth considering. The Mograt Island Archaeological Mission (MIAMi) team have been working extensively to document all fortified sites on the island (e.g. Becker 2008; Rees *et al*. 2015). On the northern bank of Mograt, Mikeisir fort (Type Two) with late Meroitic and Post-Meroitic small finds was documented. It was abandoned in the Early Christian period, at approximately the same time as the construction of the fortified sites at Ras el-Gezira and El-Karmel (both Type One). It seems that Mikeisir was not in use throughout the medieval period, while El-Karmel and Ras el-Gezira were inhabited. The distance between Mikeisir and El-Karmel is *c*. 21km, while Ras el-Gezira was built just 5km east of the Type Two fort.

The construction techniques and places chosen for these fortifications may be contrasted. Early Christian defences were built using stone and mud brick, while the Mikeisir fort was erected only with stone material. Vertical masonry is seen throughout the construction of the Mikeisir curtain walls, while this technique was not implemented on other sites at Mograt. Ras el-Gezira is on the tip of the island; El-Karmel covers the top and slope of a hill. Both have a strategic position whereas Mikeisir was erected on relatively flat ground which did not increase the defensive potential of its curtain walls. It looks as if these were diverse traditions for building fortifications.

This observation is intriguing and a few explanations are possible. It seems that the Type Two forts constitute a group that might have been independent from the Type One fortified sites. It also appears that these forts are earlier than the Early Christian fortified sites. It is possible that each side of a conflict built their own defences. For example, perhaps the Early Christian fortifications belonged to the Makurian authorities, while the regular Type Two forts could have been the result of Alwan activities.

There are many unanswered questions when it comes to this group of forts (Type Two). We do not know who built these defences or why. Was it the Meroitic authority, in order to protect their centre of power? Perhaps the Alwan or Makurian kings put this idea into motion? If so, then at what point in the Post-Meroitic or in the Early Christian period did this occur, and how do we explain the territorial overlap with the Type One fortified sites? A third hypothesis could be that some forts were built in the late Meroitic period, and later various rulers (Makurian and Alwan) simply reused the sites and added other defences. Each of these explanations is possible, but with the data currently available, it is impossible to provide sufficient evidence to decide which is more likely.

Approaching the issue

A time frame is essential for understanding who built the forts in the Middle Nile Valley and why, because knowing the chronology of the forts will help narrow down the number of potential authorities involved. Currently, we can say that this group of forts was built at some time in the Meroitic/late Meroitic/Post-Meroitic/Early Christian period. This is a period of several centuries, and an eventful time. It leaves several possible solutions to this issue.

Archaeology has developed numerous methods to establish relative and absolute chronology. However, it needs to be remembered that the precise years when the construction was initiated, and when it was completed, are beyond the reach of our research. All available methods deployed provide only approximate dating.

It is important to try to understand how the forts were originally used as this can particularly provide additional data in recognising why they were built. The forts are similar to Roman military installations, but were they used in the same way? Physically similar objects can have different meanings in various cultures, thus similarities to Roman fortlets do not necessary mean that the function and meaning of the Middle Nile defences were the same.

This question is the one that was least developed in previous research. To study the original use of the forts, samples and small finds from the first phase of the occupation within the enclosures would be required. However, most forts were only surveyed, which mainly provided general information about the architectural remains inside, as well as abundant proof of intensive erosion.

The possibilities for studying their original usage are restricted by many factors collected together under the term 'formation processes' (Schiffer 1983). The circumstances in which the items and objects used by the first settlers of the forts were transferred from circulation to the ground and into archaeological layers, finally becoming small finds or samples, are highly individualistic. The best example of this is weaponry in Nubia. It is rarely found at fortified sites, while Post-Meroitic tumuli burials often yield a large collection of spears and arrowheads, and the best preserved graves may contain even bows and quivers.

Post-depositional processes can damage the remains and/or strip them of the original context. Factors such as erosion, secondary settlement activities, degradation etc. can limit the range of studies suitable for the finds. Such objects when analysed without context can provide a highly narrow or distorted understanding of the people who made and used the artefacts. In the case of forts, which were often re-occupied, this is a major obstacle.

Chronology of the forts – methods and challenges

To make the results as reliable as possible, various procedures to establish the chronology of a site needed to be considered. Archaeology has developed and uses numerous methods and techniques to establish a more precise chronology of sites and artefacts, but all of them give only approximate dates. Only the use of several methods together gives credibility to the results and can thus be a tool to narrow down time spans.

Almost from the beginning of archaeology, researchers who studied the past noticed the usefulness of ceramics for chronological estimations. With its abundance at archaeological sites and a multiplicity of form, fabric and decoration, pottery is a sensitive tool for delineating stylistic changes through time and for tracing cultural relation (Rice 2005, 436). Until now, many archaeologists consider that the primary use of ceramics is to obtain chronological information. Although, in modern archaeology chronometric (absolute) dating is increasingly gaining wider popularity, on the majority of excavations the basic chronology is still derived from the study of ceramics (Orton *et al*. 2003, 182; Santacreu *et al*. 2017, 188).

When it comes to studying the pottery assemblage or a singular vessel, a 'complete' characterisation is impossible, since there are potentially an infinite number of attributes that can be recorded (Sinopoli 1991, 44), and naturally, there are some generally accepted standardised procedures to be followed (see Orton and Hughes 2013; Rice 2005; Shepard 1976); however, in the end, it is the individual researcher's task to customise these rules to address the questions and circumstances faced in the field.

Ceramic-based chronology is always relative and it can be established mostly by using one of two methods: cross-dating and sequence dating. The later technique is based on seriation – aggregating and classifying objects (ceramic artefacts and assemblages), then placing them into a sequence through time (Liiv 2010, 71). Regrettably, the number of finds from the forts is too sparse, and their state of preservation is too incomplete, to conduct such analysis.

In this research, only the first method mentioned could be applied. Cross-dating is generally based on the assumption that pots from different sites characterised by similar variables are approximately contemporaneous or can be attributed to the same culture (Renfrew and Bahn 2015, 111). Some features can even indicate, at least potentially, the products of the same workshop. So the focus of this method is a search for parallels within the assemblage among the materials from the various sites. To obtain satisfactory results, the associations cannot be based on the minor features. Technological aspects, clay fabrics, forms of vessels, and lastly ornamentation are the factors that should be taken into consideration.

When it comes to the practical application of this method, a few possible drawbacks may be faced at archaeological sites, and they have to be taken into account while planning the work. The first one lies in the pottery assemblage itself. It may happen that the ceramic sherds will be too sparse in number, or too eroded, to allow any valid estimation. Not all sherds are equal in the information potential they carry, and more common, are fragments with little diagnostic value. Another obstacle may be in the state of knowledge: how well-recognised and published are pottery assemblages from other archaeological sites in the region? Without a comparative base, the search for parallels

and associations made between ceramics can be problematic, and in the worst case, impossible. The human factor also has to be taken into consideration. The lack of experience or level of knowledge of the researcher about the pottery from other sites may negatively influence the correct identification and interpretation of the finds.

However, despite all of these drawbacks, the cross-dating method can bring satisfactory results in the chronological attribution of architecture. To avoid erroneous conclusions one important condition must be met: pottery samples, just like all other materials used for chronometric dating, have to be collected from well-defined contexts. When the main research question concerns the chronology of a fortification's construction, the task of the pottery specialist is to identify what kind of pottery already existed or was in use at a particular time. For this purpose, the most useful material should be recovered, if possible, from below the foundations, from the walls and from the first occupation layer in the fort providing *terminus post quem* and *terminus ante quem* dating.

Stone architectural remains in Nubia can be drystone, or bonded with mud or lime mortar, keeping in mind that the percentage of lime in the mortar can vary. In the case of fortifications, mud mortar was usually used. In less substantial walls, the drystone technique was also often used. Drystone is common on sites away from the river where water was a valuable resource. To strengthen the mud mortar, pottery sherds, gravel, pebbles and organic materials may have been used (**Figure 1.27**), thus, a detailed investigation of mud mortar can provide dating material: pottery, as well as organic samples, that can be used in establishing an absolute chronology. Mud mortar may contain an admixture of animal dung and/or chaff. Animal dung, depending on the diet of the animal, may contain undigested seeds and fragments of plants, while chaff added to mortar usually is a seasonal agricultural by-product. Furthermore, radiocarbon dating using accelerator mass spectrometry (AMS) reduces the weight of required samples to *c.* 5–10mg. This provides an opportunity to obtain absolute dates from organic materials extracted from the mortar and brings the researcher closer to discovering the time of the fort's construction. Radiocarbon dating can provide results with an error of approximately +/-30 years.[2]

Figure 1.27. Pottery sherds in the curtain wall of Marakul (photo Aneta Cedro)

Chaff temper was used for AMS radiocarbon dating at Qasr Ibrim. There, the analysis confirmed the early chronology of the first fortification built on top of the hill. The enclosure was made of mudbrick and stone. A sample was taken from the mudbrick where the admixture of chaff was clearly distinguishable. The date was 2690+/-90 years (Horton 1993, 268).[3]

A single radiocarbon date should be treated with caution. A sequence of absolute dates is more reliable, thus samples from the earliest occupation layers in the fort, as well as from remains preceding the construction of the curtain walls should also be analysed. If the mud mortar has a fairly unified composition without any large inclusions or binding material, then it might be suitable for optically stimulated luminescence – OSL. This method requires that the sample have a consistent mineral structure and is focused on measuring doses from ionizing radiation. The analysed material should be homogeneous, that is with a small organic fraction content. This method is the most suitable for geological sediments. When applied to archaeological layers where content is varied, the results will be an average from all the materials in the sample. If, however, the mud mortar is unified, then there is a chance to obtain reliable dating. Results of such an analysis would give the date when the mud mortar was exposed to the sunlight for the last time, thus indicating the time of preparation of mortar and the construction of the fort. However, the precision of OSL dating is still debated. Under perfect conditions the error factor is approximately 5% of the date. Perfect conditions are rarely possible for a sample

[2] See further https://radiocarbon.pl/en/types-of-samples-suitable-for-dating/ [accessed 6.05.2020].

[3] Sample no. OxA1061.

coming from an archaeological context; hence, this method should be considered only as a last resort when other techniques fail to provide consistent results.

With the heavy erosion of the forts and occupation layers inside and outside the enclosures, a detailed surface survey of the entire area is a method worth considering. Heavy post-deposition processes and lack of intensive accumulation have resulted in the presence of large numbers of artefacts on the surface. The possibility that materials from any period can stay underground without any representation on the surface is, in this situation, quite low. The result of a surface survey on this kind of site will be a distribution of various artefacts in the forts and around them giving information about potential periods of past activities. While the exact resurfacing location of the small finds has low informative potential and cannot be connected with any phase of the fort, the presence of such material in the assemblage is of value.

The chronological sequence of surface material can be compared with that of the small finds obtained during excavations. If the artefacts from the stratigraphic sequence are comparable to the surface sequence, then the situation is clear. The lowest layers in the fort can be labelled as the first occupation phase of the enclosure. To visualise this, let us consider an example. Let's assume that there are heavily eroded remains of a fort where little accumulation has occurred. In this hypothetical site, during excavations Early Christian pottery was identified in the lowest layers, and a mixture of Late Christian and Funj period pottery in the upper layers. Now, if during the detailed surface survey, older materials are not recognised in the area enclosed by the curtain walls around the fort and in the debris from the defences, then it might be assumed that the Early Christian period was the time of the first substantial occupation period of the fort.

This is the simplest case, and is quite clear. The situation can become more complex if older material is found during the surface survey, for example Post-Meroitic pottery. Then, we would have to consider that the Early Christian layer might not be the first phase of settlement in the fort. In such a complex situation other possibilities also need to be considered. For example, the fort may have been built on an existing settlement or there may have been some surface cleaning before the Early Christian phase structure was created, resulting in the removal of the older materials. In all situations on heavily eroded sites, it is worth comparing surface survey results with materials documented during excavation to get an idea of whether it is a complex, or a highly complex, settlement.

How was a fort originally used?

Only materials obtained from the lowest layer/s associated with the foundations of an enclosure should be analysed to answer this question. What kind and type of remains can be expected? Often the enclosures contained substantial architecture inside. Studies of these structures can begin with an analysis of satellite imagery, and a detailed archaeological survey of the area inside the enclosure. When little has survived on the ground, then geophysical prospection can bring valuable information.

For years magnetometry has been considered as the most suitable technique for initial geophysical inspection of the archaeological sites in the Nile Valley. Recent georadar results, especially from Hamadab (Ullrich and Wolf 2015, 395) and Old Dongola (Herbich and Ryndziewicz 2019, 170–171), have indicated that other geophysical methods can also be applied successfully in the region; however, georadar requires intensive preparation of the investigated surface. All stones, red brick fragments, and any other obstacles that can be removed should be cleared because the radar needs to maintain a firm connection with the ground. The areas enclosed by fortification are rarely rubble free. The magnetic method in these circumstances can be considered less invasive and thus much more suitable for initial research (**Figure 1.28**).

Magnetometry offers an efficient way to collect the data and enable detection and identification of a wide variety of archaeological features (David *et al*. 2008,

Figure 1.28. Magnetic survey at Hosh el-Kab fort (photo Mariusz Drzewiecki)

20–21). It has proved its usefulness in the Nile Valley due to the uniform geomorphological structure of the alluvial deposits covering large areas in the Nile Valley. Soil left by annual floods creates a balanced background in which building materials, even mud brick structures, can be identified due to their differing magnetic properties (Herbich 2019, 197).

The information provided by satellite imagery, survey and geophysical prospection does not have much chronological value. This issue can be tackled by targeted excavations conducted in locations where architectural remains have been identified. Detailed studies of stratigraphy in such places can provide information on building phases and their chronology. The most important would be to identify remains that were built during the first phase of a settlement.

If such early architectural remains are recognised, then spatial organisation of the buildings inside the fort should be analysed in search of patterns and unusual solutions. The main issues would be: Are there regular structures that could have served as barracks for a garrison or are there any larger buildings inside, which could have been the residence of the local authorities or a fort commander (if there were any)? Are there any temples, shrines or churches inside? Are there granaries or other storage facilities? All of this information can provide insights into the life of the fort's inhabitants.

Pottery is another category of finds found in the forts. Previously, ceramic artefacts have been presented as the kind of material suitable for chronological investigations. In this context, however, the function and type of the vessels may be more important. Is the assemblage uniform? Are the forms, shapes, techniques similar or is there great variation? Are there many fine wares or only utilitarian kitchenware? Are the pottery assemblages between the forts comparable? The types and groups of pottery can give insights into the lifestyles maintained by the inhabitants.

These considerations bring us to the issue of luxury goods, such as fineware pottery, and imported pottery vessels containing luxury goods such as wine, olive oil, etc. This same issue can be further researched by the analysis of glass vessels, fine metal and wooden objects, gemstones, semi-precious stones, etc. These could point to the presence of elites and/or traders in the forts.

Food remains, mostly faunal, can also be markers of the status of individuals inhabiting the forts. For the medieval period, consumption of meat and selected meat cuts, especially beef, is an indicator of an elite lifestyle. Other people ate meat rarely, and if they did, goat/sheep was more common (Osypińska 2018).

Since the forts are uniform and spread over a large area, then the basic assumption would be that they were not the seats of individual rulers, but rather military stations. Small variations in the dimensions of the enclosures could be interpreted as a result of the differences in the size of the garrison originally scheduled to be stationed in each of the forts. If this is the case, then the small finds and samples obtained from the earliest layers in the forts should indicate a quite uniform and utilitarian material culture.

CHAPTER 2

FROM THEORY TO PRACTICE – GOING INTO THE FIELD

Mariusz DRZEWIECKI and Aneta CEDRO

Researching the forts – obstacles and challenges

In theory, detailed investigations should cover all of the fortified sites listed as Type Two enclosures. There are nine forts recorded between the Fourth Cataract and the confluence of the two Niles. Sites that are only potentially Type Two edifices should also be included in the research. This would add at least four additional fortified sites. Altogether, 13 locations should be investigated. Archaeological and geophysical surveys, as well as excavations, should be conducted to obtain various materials enabling chronological considerations.

Over the last few decades, an attempt was made to develop this program. The research started as an archaeological survey (**Figure 2.1**). In 2008, a project entitled *Fortresses of Sudan* was initiated (Drzewiecki and Rączkowski 2008). The plan for the research was simple and focused on visits to several fortified sites described or mentioned by O. G. S. Crawford during his investigations in the 1950s. He made detailed plans of selected fortified sites and published extensive descriptions of the remains (Crawford 1953a; 1953b). Thanks to this, new observations and various types of changes made to the sites could be observed. The visits resulted in additional documentation of the architectural remains, as well as extensive data concerning the archaeological and modern contexts of the defences (Drzewiecki 2016b).

Altogether 15 various fortified sites were inspected without giving the regular, Type Two forts special attention. Among others Mikeisir, Gandeisi and Jebel Nakhara were visited. During the preparation of the expedition and later in the field, the team faced numerous obstacles that prevented them from visiting all of the planned sites (**Figure 2.2**).

In the years that followed, an attempt was made to extend survey activities to all the remains of the fortified sites between the downstream end of the Fifth Cataract and the confluence of the Niles. The aim was to create a database for the remains of the defences, and the archaeological sites that surrounded them. Due to restrictions, mostly limitations imposed by other research concessions, not all known sites were reached; however, thanks to an approval from the National Corporation for Antiquities and Museums of Sudan, in 2011 and 2012, surveys that included several forts were conducted (**Figure 2.3**). These were Abu Mereikh C, Abu Sideir, Wad Mukhtar, Hosh el-Kab, Abu Nafisa and Jebel Umm Marrahi (Drzewiecki and Stępnik 2012; Drzewiecki and Polkowski 2016).

In May 2012, the Sudan authorities released an official announcement detailing a plan to create a hydro

Figure 2.1. Archaeological survey in Mikeisir fort, 2008 (photo Mariusz Drzewiecki)

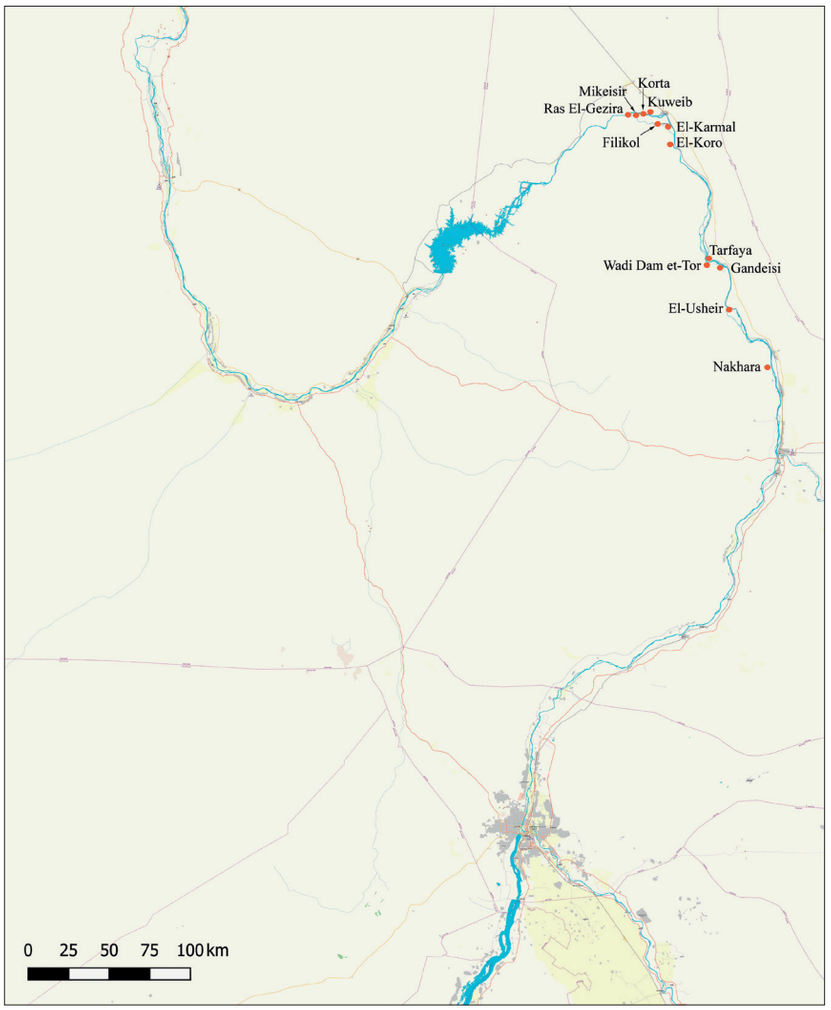

Figure 2.2. Fortified sites visited during the first season of the *Fortresses of Sudan* project in 2008 (prepared by Mariusz Drzewiecki, background OpenStreetMap)

power station and dam in Shereik, at the northern end of the Fifth Cataract. As a consequence, the area was divided into new research concessions among a few interested institutions. This situation complicated plans. Data collected during the *Fortresses of Sudan* project was made available as a GIS database, and included all the archaeological sites recorded during our surveys in the area of the Fifth Cataract (**Figure 2.4**). The database was sent to the researchers interested in taking part in the salvage action in the region. It was designed to open in Google Earth and contained detailed information on the location of archaeological sites, individual features visible on the surface, preliminary chronology (where it was possible to determine) and type of site (cemetery, settlement, rock art, quarry etc).

At the beginning of 2013, the new teams that wished to start research close to the power station construction site were stopped by the inhabitants and asked to leave the area (Welsby 2013, 131). At the same time, the National Science Centre in Poland approved funding for a project proposal focusing on archaeological remains on Gandeisi Island, just a few kilometres from Shereik. The premise of the research was to understand why the Gandeisi fort was built, when it had been erected, and how it had been used throughout the centuries. Unfortunately, with the rapid development of the aforementioned events at the Fifth Cataract, the fieldwork had to be shifted and started in another place. The most suitable alternative option turned out to be in the Third Cataract region, in the small village of Jawgul (Drzewiecki and Maliński 2013). The research at

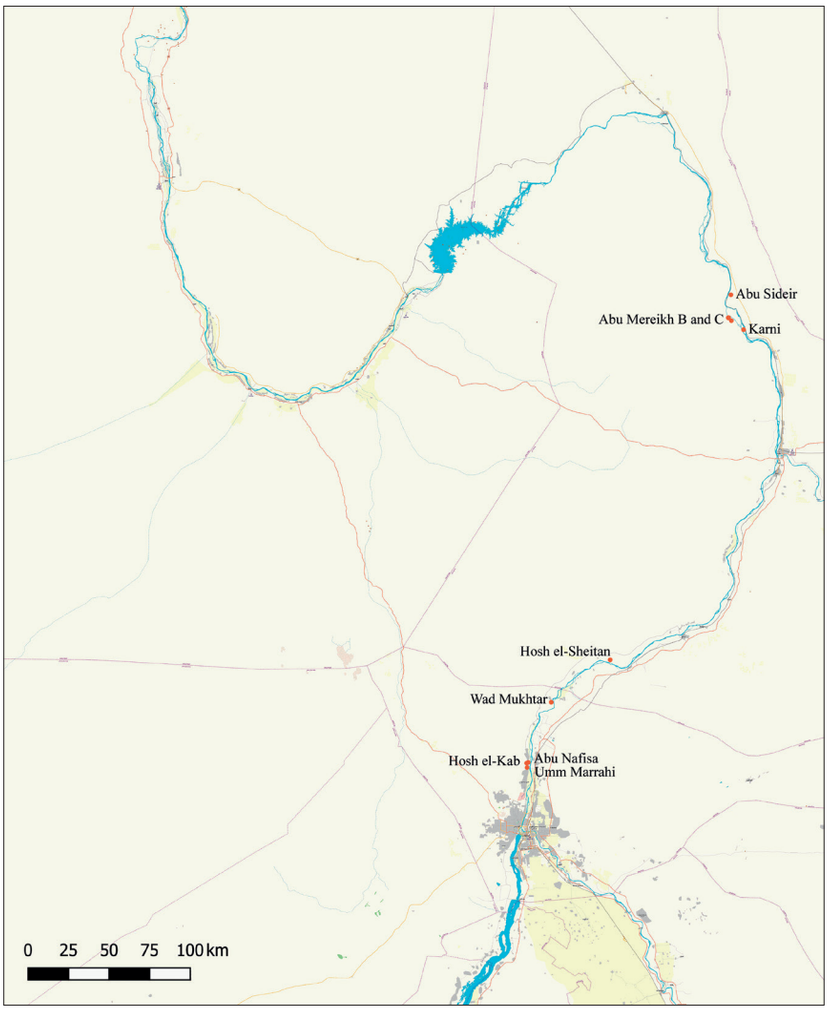

Figure 2.3. Fortified sites visited in the 2011 and 2012 seasons of the *Fortresses of Sudan* project (prepared by Mariusz Drzewiecki, background OpenStreetMap)

Jawgul was fascinating; however, it delayed the efforts to understand the group of forts further upriver.

Over the three years of survey (2008, 2011, 2012) in the region between the Fourth Cataract and the confluence of the Nile, several obstacles emerged that made the full research of the forts conducted by a single team of researchers difficult. Some forts were under investigation by other projects, and access to these sites was denied. This was not a disaster since it was hoped that their ongoing research would be published in future, providing information about the architectural remains and their chronology. A worse situation occurred when the forts were in a research concession and the host institution was currently focusing on other sites and periods in the region, leaving the remains of fortifications for later, unspecified future research. In those cases, no new data was to be forthcoming. The third obstacle was the development of the events at the Fifth Cataract region mentioned above, which made the access to some of the forts impossible.[1]

In 2016, an opportunity opened for new research with a project entitled *The Emergence of Early Medieval States in the Middle Nile. Archaeological Sources*, directed by Bogdan Żurawski and funded by the Foundation for Polish Science. One of the key issues of the

[1] At this point one specific research team should be acknowledged as it was the only one open to activities of other researchers without any demands or expectations. During the *Fortresses of Sudan*, the survey of Wad Mukhtar fort was made possible. It is located in the research concession of Charles University in Prague. The director of the Czech team at that time was Lenka Suková.

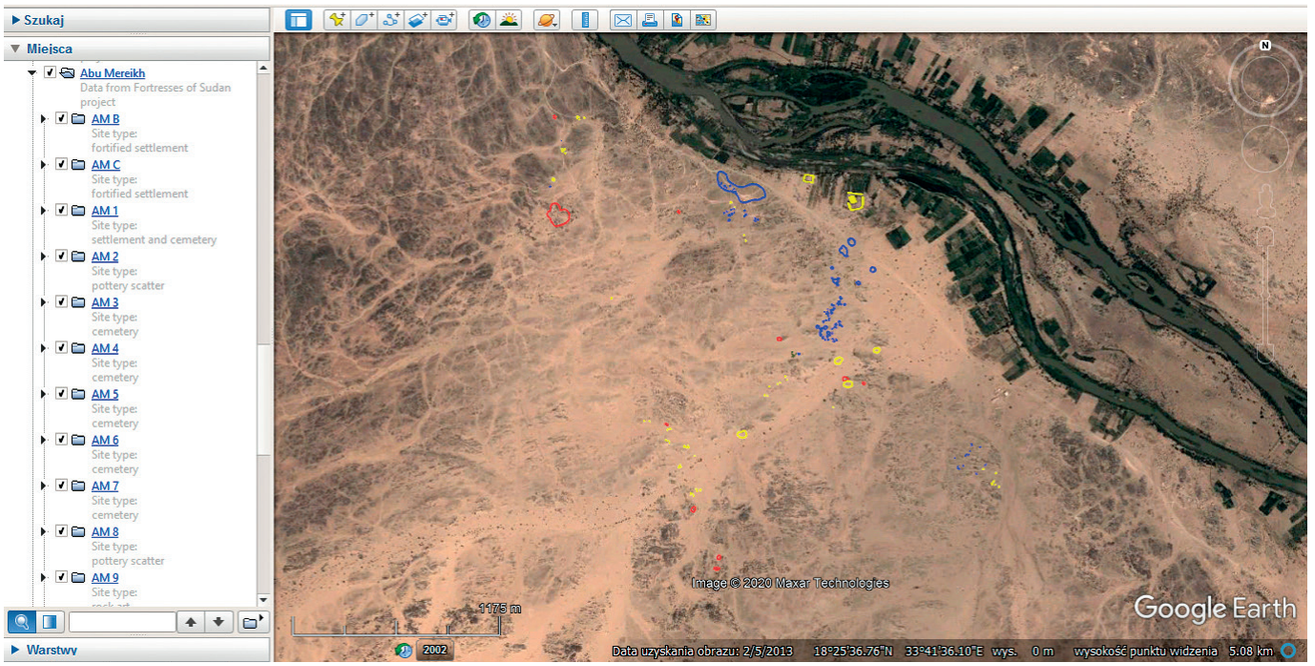

Figure 2.4. Interface of the database containing all sites visited at the Fifth Cataract

project was the investigation of fortified sites in the region. It was a three-year project, during which research on some of the forts was considered (Żurawski *et al*. 2018). The Fifth Cataract, where the Polish Centre of Mediterranean Archaeology gained a new concession, was unfortunately still inaccessible. This is the reason why their fieldwork focused on sites in the Southern Dongola Reach and the Third Cataract region (Żurawski *et al*. 2017).

The concentration of forts most suitable for research

In 2011 and 2012, during the *Fortresses of Sudan* project, the southernmost forts were surveyed. They constituted a cluster of three enclosures built on the same bank of the Nile at a short distance from each other. Abu Nafisa is *c*. 500m from Hosh el-Kab and Umm Marrahi is *c*. 3.5km further south (**Figure 2.5**). The first two, Abu Nafisa and Hosh el-Kab, had never

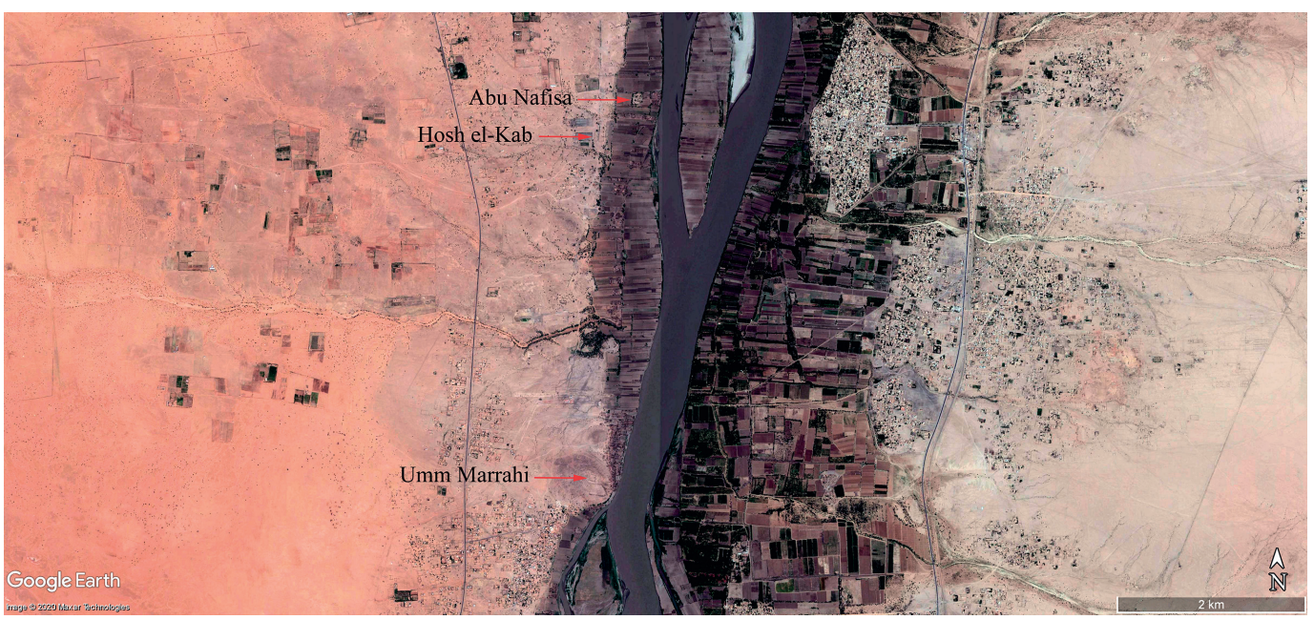

Figure 2.5. Location of the cluster of three forts (Google Earth)

Figure 2.6. Hosh el-Kab fort in 2010 and 2014 (Google Earth)

been excavated. Umm Marrahi is present in the literature as the site was researched by a team from the University of Khartoum in the 1970s (El-Hassan 2006) and at the beginning of the 1980s prehistoric remains on top of the hill, discovered at a short distance from the fort, were investigated and published (Gautier *et al.* 2002; Elamin and Mohammed-Ali 2004).

The concentration of three forts is unique. In the Middle Nile Valley, whenever there are more than two defensive sites next to each other, they usually are very different in terms of layout, construction technique, materials, and small finds indicating that they were built at different times. The three southern forts, at first glance, looked similar and their preliminary chronology was also of the same periods. The assumption was that despite similarities, the three forts were probably not in use at the same time. At least one enclosure must be older or younger than the others; however, the relative time span was probably short. Thus the area was considered a key place to study the chronology of the Type Two forts. Research at all three enclosures had the potential to identify the sequence of this defensive architecture.

Looking at this issue from a different angle, in 2015, results of excavations at Mikeisir fort were published (Rees *et al.* 2015, 185–193). The paper presents an analysis of the small finds and the radiocarbon chronology that was established for one of the northernmost forts belonging to the analysed group. In this context, research in the southernmost enclosures could provide information on similar sites from the opposite end of the region. Having chronological data from the northernmost and the southernmost forts would bring us closer to the questions of who built the group of forts and why.

In 2016, an event occurred that accelerated preparations for fieldwork. Google Earth published images depicting substantial changes in the area of Hosh el-Kab. Satellite images released at that time showed the situation from the beginning of 2014. At approximately that time, a large 10m wide irrigation channel began to be excavated parallel to the Nile, and was cutting into the remains of the fort (**Figure 2.6**). Some parts of the land surrounding the future channel were levelled to create suitable places for fields (Drzewiecki 2016c, 208–210). It became obvious that this area would become agricultural land in the near future. Without archaeological investigation numerous remains would be lost without study and documentation. The National Corporation for Antiquities and Museums of Sudan was informed of the situation. The agricultural investment was stopped, but by that time the channel already had been dug through the north curtain wall of the fort, as well as through much of the entire length of the interior, stopping at the remains of the south wall.

The National Science Centre in Poland once again granted funds for a project[2] hosted by the Institute of

[2] Project no. UMO-2016/21/D/HS3/02972.

Mediterranean and Oriental Cultures, Polish Academy of Sciences. The title of the project was *Did Meroitic rulers build fortifications? Fortified sites and politics in Upper Nubia during the fall of Meroe and rise of the Kingdom of Alwa*; a result of the considerations presented in the previous chapters. The stress was placed on the Meroitic period, not only because there was a possibility that the Kushite rulers may have built the forts, but also because the earliest traces of settlement connected with the defensive structures are the most difficult to identify.

Imagine a hypothetical situation in which the Meroitic rulers built a fort and used it for a brief time. With the development of the Kingdom of Alwa the fort could have been re-occupied for a much longer time. The Alwan inhabitants could have, deliberately or not, disturbed most of the traces of the original hosts and produced at the same time, their own material remains. In this hypothetical situation, the Alwan remains would constitute a more substantial group of the finds, while Meroitic materials could have been more scattered and less numerous.

The studies were focused on searching for Meroitic traces. It was the priority to identify and study even the smallest quantity of Meroitic materials. This way, if the forts turned out to be Alwan in origin, then there would be no doubt that the team had made the maximum effort to rule out potential Meroitic origins of the edifices. Two seasons of fieldwork were scheduled, focusing on obtaining information enabling chronological consideration of the three southernmost forts in the Middle Nile Valley – the forts of North Omdurman.

Investigations at Hosh el-Kab and Abu Nafisa

In the first season, the fieldwork focused on Hosh el-Kab and Abu Nafisa (Drzewiecki *et al*. 2018). In addition, an archaeological survey was conducted in the area surrounding the defences. The work started with the two forts since they were directly endangered by the agricultural development and had never before been the object of regular studies. Research conducted in 2018 at Hosh el-Kab lasted from the 10th to the 23rd of January and at Abu Nafisa from the 18th to the 25th of January.

At the beginning a detailed documentation of the remains was made before the start of excavation. Three-dimensional modelling based on the Structure from Motion technique was applied (**Figure 2.7**). Several points were marked on the surface of each fort with nails that each secured a small piece of phosphorescent paper bearing a number. The ground control points were measured using a total station set on a local metric grid. Subsequently, a series of low altitude vertical aerial photographs were made using a drone. For Hosh el-Kab, 611 photos were made and 31 ground control points were marked over the entire surface of the site. For Abu Nafisa, 331 photos were taken and 18 ground control points were set. Hosh el-Kab, with the modern irrigation channel and piles of soil along it, had a much more complex topography and more photos and control points were needed to accurately document the surface of the site. All data was transferred to Agisoft PhotoScan Professional (Version 1.3.4 build 5067 – 64bit) to create three-dimensional models. Based on these, digital elevation models (DEMs) as well as orthomosaics were created and used in further research and documentation.

The second step was to lay out the trenches. At Hosh el-Kab, three areas (Areas 1–3) were selected for excavations (see Figure 2.7). Area 1 was located at the north curtain wall, on the western edge of the modern irrigation channel, exactly in the place where it cut the defences (**Figure 2.8**). The damage done to the site by the agricultural development was great. Walls, as well as all of the anthropogenic layers had been cut through, and a depth of at least one metre into the virgin soil layer was reached. This was a hard and solid desiccated alluvial layer. Cleaning and trimming *c*. 5m along the edge of the irrigation channel allowed us to document a cross-section through the curtain wall and surrounding layers.

Areas 2 and 3 trenches were placed in the western part of the enclosure. The focus was put on this part of the fort because the eastern side was closer to the river and could have been affected by floods. There are examples in the Middle Nile Valley where large deluges caused great damage or even destroyed the riverside part of the defences. In Selib (Southern Dongola Reach) and Karmel (Mograt Island), this happened while the sites were still inhabited and the walls were rebuilt afterwards. The newer parts of the walls covered all of the older remains, making investigation of the oldest defences impossible. Since the oldest remains of the original defences were the most important to answer the research questions, the riverside section of Hosh el-Kab was, in this way, not the most suitable place for excavation. The same reasoning was applied at Abu Nafisa, where two trenches were set in the western inner corners of the fort (Areas 1 and 2).

At Hosh el-Kab, the trench in Area 2 was placed by the remains of the desert-side gate, and the trench

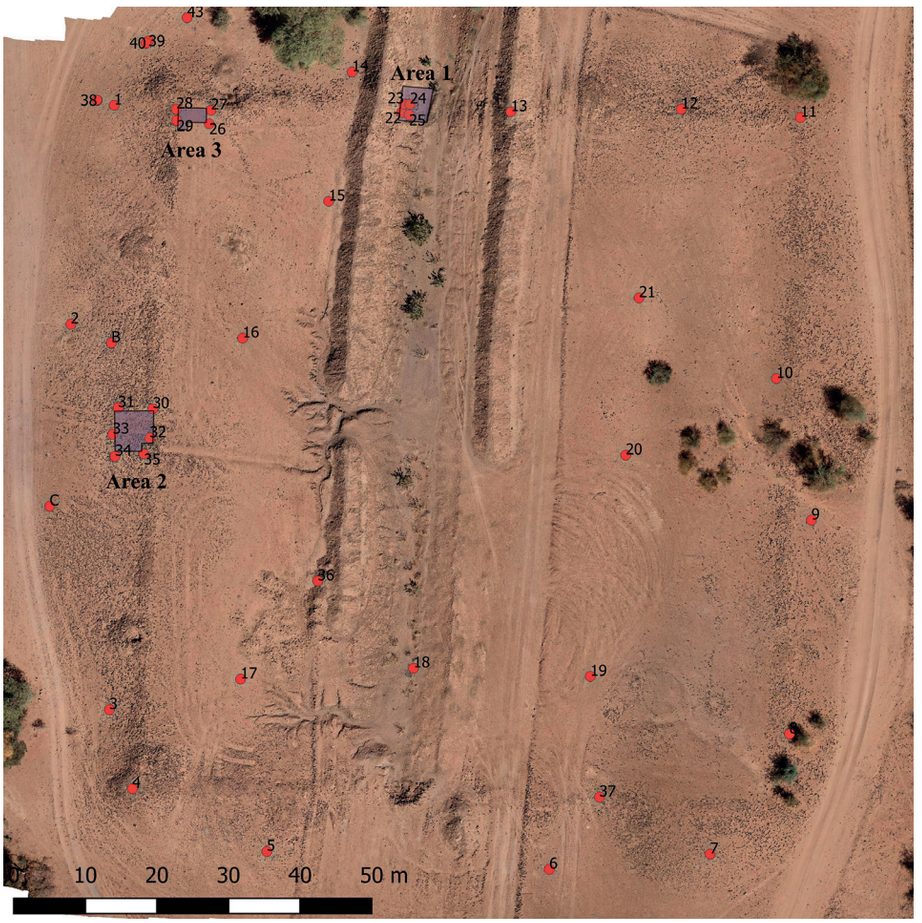

Figure 2.7. Hosh el-Kab orthomosaic with ground control points and Areas 1–3 (prepared by Mariusz Drzewiecki)

Figure 2.8. Hosh el-Kab aerial photo, arrow indicating the location of Area 1, facing south (photo Mariusz Drzewiecki)

Figure 2.9. Hosh el-Kab, excavations in Areas 2 and 3, facing south-west (photo Mariusz Drzewiecki)

Figure 2.10. Abu Nafisa, aerial photo of the site. The arrows indicate the location of the grave and the building, facing north-west (photo Mariusz Drzewiecki)

in Area 3, in the north-west inner corner of the fort (**Figure 2.9**). These are the locations where sections of the defences meet, and where the investigation of any connections between them is possible. Since the identification of the oldest phase of the fort was important, these places were the most promising for placement of the trenches. The south-west inner corner of the fort was not chosen because of a massive amount of stone debris, that formed a circular structure that partly overlapped the curtain walls. It seems that after the fort fell into ruin some activity took place in that corner, and there was the threat that older phases could have been disturbed. The north-west corner seemed to have no later additions.

At Abu Nafisa, it was necessary to leave the south-east corner of the fort untouched. On the surface in that area, a large, oval stone feature (grave) and the well-preserved remains of a stone structure were visible (**Figure 2.10**). The name of the site comes from an '*Anag*' sheikh, Abu Nafisa. In local oral histories, he was said to be a man who had chosen to live in the ruins and was buried there. The oval grave superstructure overlaps the remnants of the south curtain wall. Stone material from the defences had been used to build the grave, as well as the remains of a dwelling visible next to it. This also indicates that Abu Nafisa died after the fort had fallen into ruin.

The grave is well-known to the residents of the nearby villages. The villagers explained to us that it has magic properties. The residents believe that items left by the grave can only be taken back by their owners. If someone else were to pick up any of the objects, then they would experience misfortune. In the surroundings of the grave various kinds of items were noticed, starting with tools used by farmers working in the surrounding fields, metal cooking pots and kettles, and ending with shoes and robes. To respect the local order of things, no objects from the grave area were removed.

No traces of gates at Abu Nafisa were noticed, although there are a few gaps in the walls. All, however, were part of modern paths and tracks cutting across the remains. Maybe in the past some constituted

Figure 2.11. Abu Nafisa, location of archaeological trenches (prepared by Mariusz Drzewiecki)

gates, but little was visible on the surface. Corners, on the other hand, were easy to locate since the line of stones creating the faces of the curtain walls was preserved and visible in many sections of the site. This is why two trenches were located in the inner corners of the fort's desert side.

The trenches at Abu Nafisa measured approximately 2 × 2m (**Figure 2.11**). In the case of Hosh el-Kab, they were irregular and adjusted to architectural features discovered during exploration. The largest there was Area 2 (6 × 5m); however, it was later reduced to include only the passage through the main wall (2 × 1.5m). The rest of the gate installations were poorly preserved or had been totally destroyed by later digging. In the case of Area 3 at Hosh el-Kab, an extension was made to uncover the entire shape of a mud brick feature discovered against the western curtain wall.

Exploration of trenches was organised in spits *c*. 150 to 200mm thick. Whenever possible, the spits corresponded to anthropogenic and natural stratigraphy. Small finds from each layer were collected separately. Later they were washed, inventoried and documented (see Chapters 1 and 5). The bottom of each layer was recorded using a series of photographs with ground control points in the same local metric grid as the general model of the site (**Figure 2.12**). Subsequently, a three-dimensional model was created for each of the layers, documenting the exploration levels as well as the colour and fraction of each layer. Thanks to the use of the same metric grid, the precise location of the trenches could be established on the general plans of the site.

Samples for radiocarbon analysis were collected from all charcoal residues discovered during exploration, but the most important came from the lowest levels and fort foundations. Samples of mud mortar were also collected from the cross-section through the curtain wall in Area 1 at Hosh el-Kab (**Figure 2.13**). Abu Nafisa

Figure 2.12. Abu Nafisa, the bottom of layer 4 in Area 2, orthomosaic (prepared by Mariusz Drzewiecki)

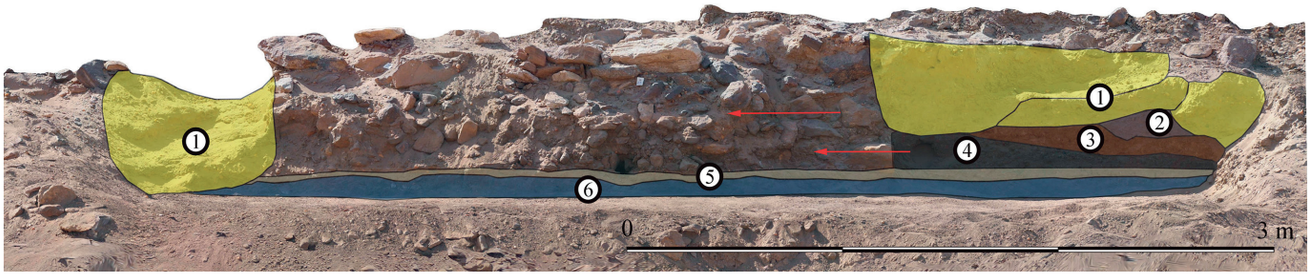

Figure 2.13. Hosh el-Kab, Area 1, cross-section through the north curtain wall, west face: 1 – modern digging; 2 to 4 – layers associated with the fort; 5 and 6 – layers below the foundations of the fort. The arrows point to the location of mortar sampling (prepared by Mariusz Drzewiecki)

was badly eroded and no traces of mortar were spotted. Neither in Abu Nafisa nor in Hosh el-Kab were pottery sherds or any other secondary materials noticed in the mud mortar or in the construction of the defences in general.

Simultaneous with the excavations, a detailed surface inspection of the entire fort and the immediate vicinity was carried out. Samples of sherds were collected from various parts and contexts at the sites, and the location of finds mapped. First, a walking survey was conducted along the remains of the walls, since the project was focused on the construction of the fortifications. Then, a complementary survey was conducted by line-walking, with transects *c*. 5m apart inside the enclosure, and additionally outside along the walls. Special focus was also given to the possible remains of architectural structures or stone shelters. Potsherds noticed, or their concentrations, were marked on the map as findspots, defined as areas of a *c*. 2m radius. The ceramic material at both sites was so sparse that it was possible to make photo-documentation of pottery from all findspots, and from most, chosen samples were collected for further study (the most informative diagnostic fragments).

For a short time, geophysicists Tomasz Herbich (two days) and Robert Ryndziewicz (one week) joined the team. They conducted magnetic prospection at Hosh el-Kab fort and began work at Abu Nafisa (Ryndziewicz and Drzewiecki 2018). A Geoscan Research FM256 fluxgate gradiometer was used for the magnetometry survey. Measurements were collected with a sampling interval of 0.25m along transects spaced 0.5m apart, within 20 × 20m grids. The data was processed in Geoplot software to produce grayscale plot magnetic maps.[3] They were assisted by Al-Neelain University graduates. During the final days of the fieldwork all of the trenches were back-filled and the modern trash (mostly plastic containers) that had accumulated on site, collected.

Archaeological survey also was used to record the past and modern contexts of the forts in order to identify any remains contemporary with the forts in their vicinity (**Figure 2.14**). In addition, the state of preservation of all identifiable archaeological sites in the area was recorded, as well as potential modern threats. The core of the survey team were Al-Neelain University graduates and Włodzimierz Rączkowski. The survey covered an area of *c*. 2km radius away from the forts. Extensive field-walking was conducted on the west bank of the Nile between the agricultural land and the tarmac road, reaching deeper into the desert in some places. The opposite, east bank of the Nile, was not investigated because it is entirely covered with modern fields; the agriculture is much more extensive there. No free spaces nor wasteland could be identified on satellite images indicating that even if there were archaeological sites on that bank, they may have been destroyed or covered with modern fields or buildings. Archaeological survey would not provide reliable results in these circumstances.

Prior to the field-walking, satellite imagery from Google Earth and Bing Maps was analysed. All potential archaeological features were marked and investigated later in the field by the survey team. Documentation of each site discovered and visited consisted of a description, photos of the area and photos of small finds. The surface materials were not collected. Location of the sites was marked using a handheld GNSS device (Garmin GPSMAP 60 CSx). The path of the survey team was documented using the same GNSS device by means of the track option with the position recorded every 15 seconds. (**Figure 2.15**). Geographical information was later transferred to QuantumGIS software where a

[3] See Ryndziewicz and Drzewiecki 2018; 2019, for further details.

Figure 2.14. Archaeological sites in the region
(prepared by Włodzimierz Rączkowski and Mariusz Drzewiecki, background image Google Earth)

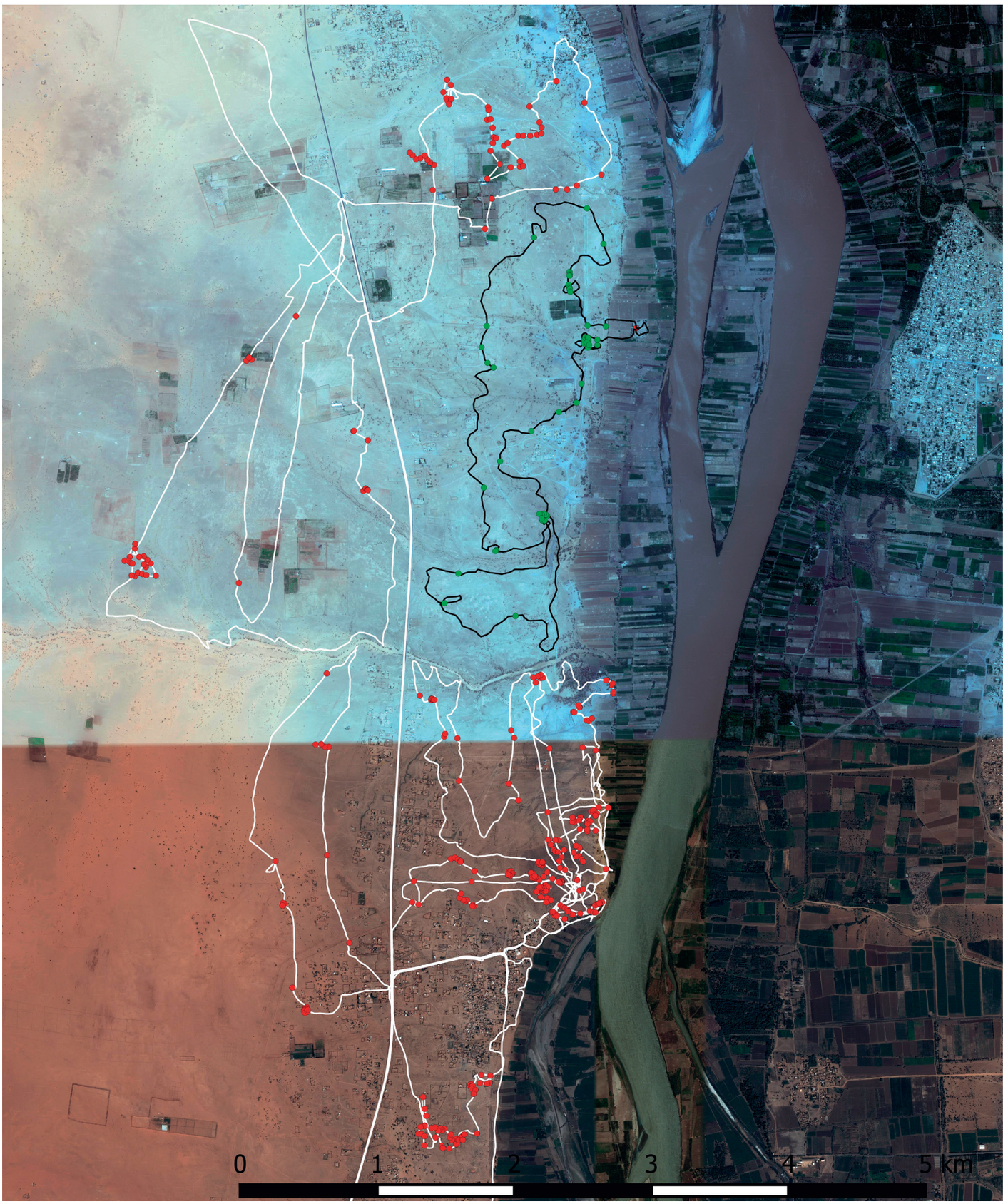

Figure 2.15. Routes of the archaeological surveys around the forts: black and green in 2011; white and red in 2012 (prepared by Włodzimierz Rączkowski)

basic database of all recorded archaeological features and places visited was created.

During the fieldwork season, the team was joined by researchers and graduates from Al-Neelain University. The graduates participated in all documentation activities and were introduced to methods used during our work. The Al-Neelain researchers provided expertise in topographical measurements and assisted in contacts with the local community. Selma Khogli Ali Ahmed met with residents of a nearby village who were in possession of archaeological artefacts. The finds were said to have been discovered during earthworks, but specific findspots were not identified. The objects comprised two bowls and one storage vessel of the late Meroitic/Post-Meroitic tradition, and probably came from one of the nearby tumuli cemeteries (**Figure 2.16**). The National Corporation for Antiquities and Museums (NCAM) inspector, Elmontaser Dafaalla Mohamed Elamin Elmoubark also worked with the local community explaining the reasons for the archaeologists' presence and activities in the region. He discussed issues related to the past and provided information about the archaeology, as well as recording oral histories connected to the sites and the region (**Figure 2.17**).

In conclusion, most of the efforts during the first season of fieldwork were the result of the scientific program aimed at identifying the oldest architectural remains of the forts and obtaining small finds and samples for further analysis. Unfortunately, the study sites

Figure 2.16. Pottery vessels found in one of the modern houses in the region (photo Selma Khogli Ali Ahmed)

Figure 2.17. Elmontaser Dafaalla Mohamed Elamin Elmoubark discussing local oral histories connected with Hosh el-Kab in 2018 (photo Aneta Cedro)

are situated far on the outskirts of Omdurman, one of the largest cities in Sudan. This means that the local, modern settlement is changing, and developing quickly to fit the needs of the growing city. In this context, the project's second aim became to record all archaeological sites in the areas surrounding the forts, and to discuss the issue of heritage with the local community.

Umm Marrahi in focus

Umm Marrahi is much better preserved that the other two forts thus, it was the focus of the second season of fieldwork conducted from the 13th of November to the 8th of December 2018 (Drzewiecki and Cedro 2019). The walls of the fort stand up to *c*. 1.5m high, however, most are covered by stone debris crumbling from the eroded upper parts of the defences (**Figure 2.18**). This is the reason excavations at Umm Marrahi required more time in comparison to the other two forts.

Umm Marrahi, due to its location, is safe from urban development and agricultural expansion. Unfortunately, there are other threats to the site. The main one is posed by artisanal digging in search for gold. In the fort and around it, traces of such recent activities are visible (**Figure 2.19**). The illegal excavations disturb the stratigraphy as well as architectural remains. Other risks are connected with stone extraction. There are numerous quarries visible on the top and slope of the hill, and some disturb the archaeological remains. Varying patination of the rock surfaces indicates that some quarrying might be ancient or medieval, however, most sites are relatively recent with the light colour of the exposed stone surface not yet patinated.

Car tracks are visible inside the remains of the fort. They lead from a deep excavation in the south curtain wall to the gate and beyond. It seems that at the south curtain wall a large portion of stone was extracted, and

Figure 2.18. Umm Marrahi, stone debris covering remains of the curtain walls (photo Mariusz Drzewiecki)

Figure 2.19. Umm Marrahi, modern disturbance at the site (photo Mariusz Drzewiecki)

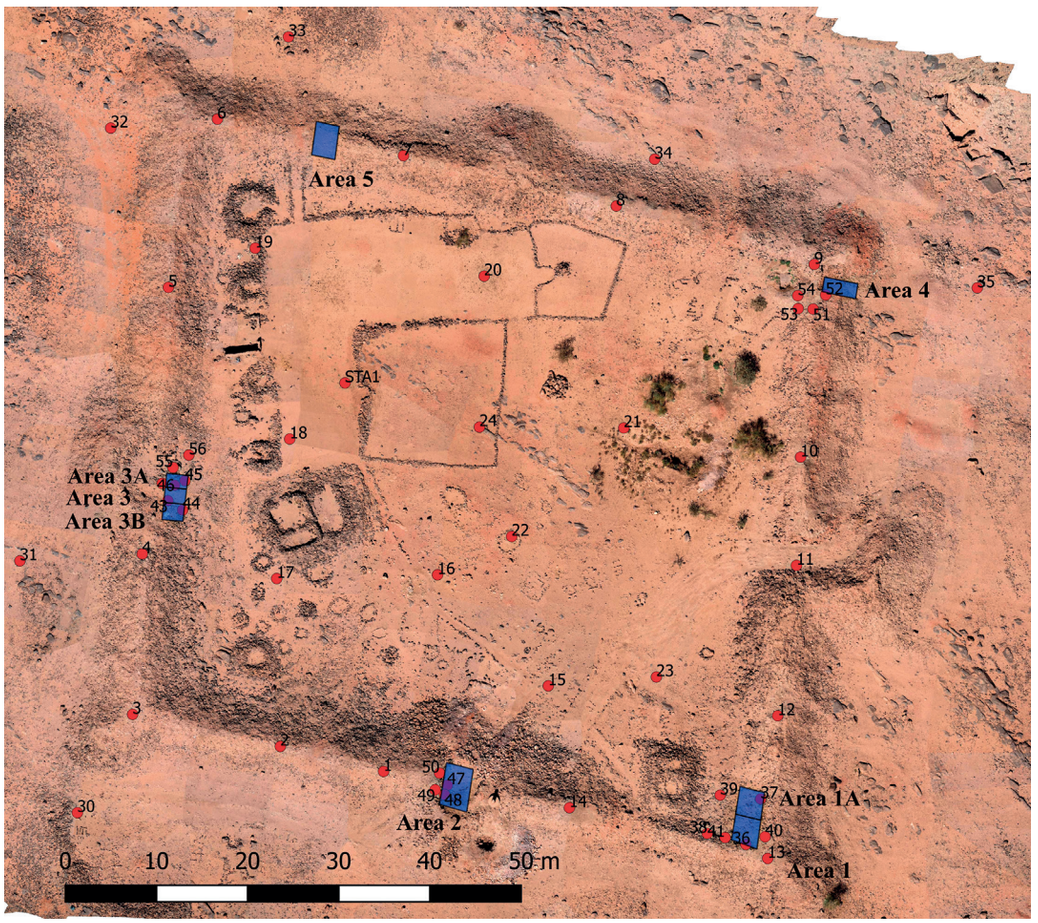

Figure 2.20. Umm Marrahi, orthomosaic of the site with ground control points and Areas 1–5 (prepared by Mariusz Drzewiecki)

the remains of the defences were badly damaged in the process. The material was loaded onto the vehicle, which came and went several times through the gate, destroying along the way the more fragile parts of the entrance.

All of the modern disturbances, and the state of preservation of the site prior to excavations were documented using the method already applied at Hosh el-Kab and Abu Nafisa. Ground control points were set and measured with a total station. Subsequently a series of aerial photographs were made (703 photos and 35 ground control points, **Figure 2.20**). The second step in the methodology was to lay out the trenches. Since Umm Marrahi is a hilltop site with an elevation reaching 30m above the surroundings, the possibility of flood damage was not a threat. Previous excavations conducted by a team from the University of Khartoum in the 1970s were concentrated in the north-east corner, and next to the outer face of the eastern curtain wall, halfway between the gate and the north-east bastion. Those trenches were easy to identify in 2018 since they were only half filled as a result of erosion. The gate was partly destroyed by recent traffic going through it. Taking all of these factors into consideration, one trench was set in the south-east inner corner of the fort, and the second in the middle of the western curtain wall, next to the inner face of the wall.

Why were these places chosen? Of the four corners, the south-eastern was the best preserved. The ground level in that area was *c.* 1m higher than in the other corners. In the south-west and north-west corners, stone bedrock was visible on the surface, while the north-east corner had already been excavated. The second trench was located in the middle of the west curtain wall because there were indicators of a second gate located in the area. On the outer, opposite side of the western curtain wall, a large stone structure was attached to the wall. At a first glance, it might have been interpreted as another mid-way bastion. This is how it was described and understood by Crawford in the 1950s (1953a, 39)

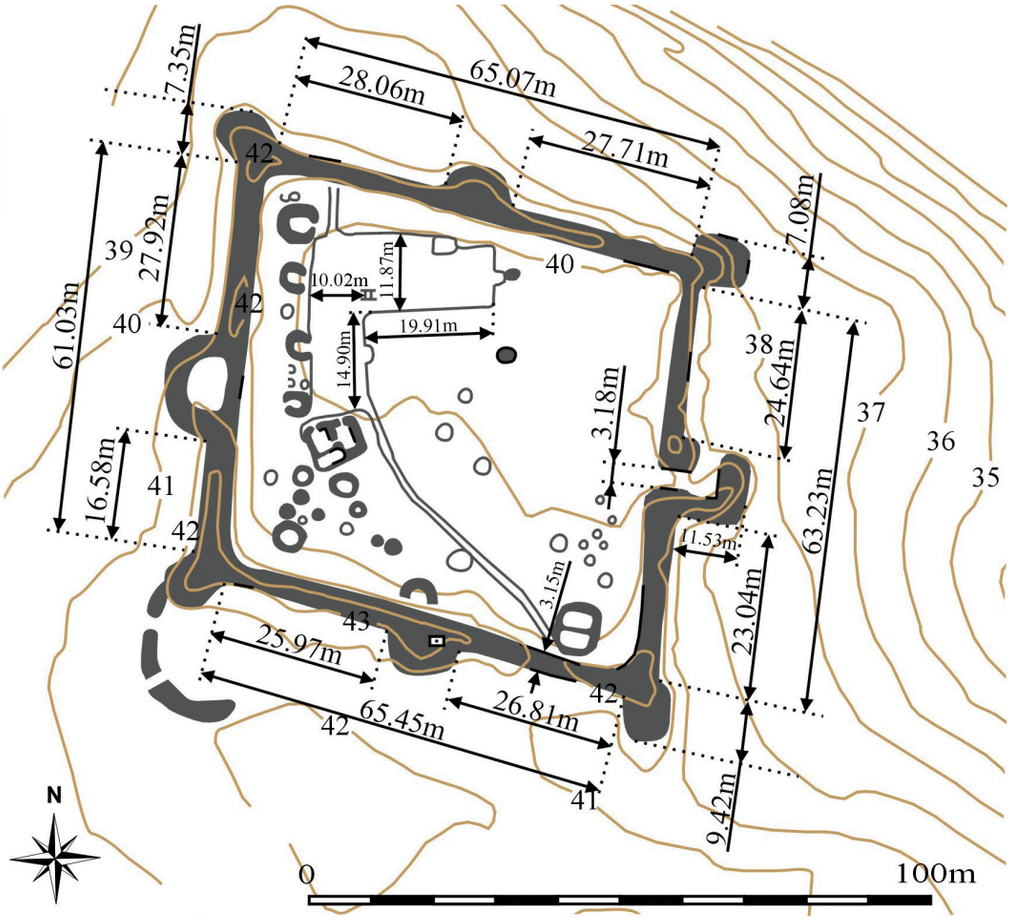

Figure 2.21. Umm Marrahi, plan of the fort
(prepared by Adrian Chlebowski and Mariusz Drzewiecki)

and by the team from the University of Khartoum in the 1970s (El-Hassan 1979, 59–60), however, closer examination of the structure revealed that it was somewhat bigger than the other mid-way bastions, and was not completely covered with stone debris. The central part was rubble-free (**Figure 2.21**). It could have been the remains of another modern dig, but not one that recent. There was also a possibility that it might have been a chamber, or an empty space indicating a feature more complex than a bastion. It might have been a second gate, equipped with an additional L-shaped wall. To verify this hypothesis, a trench was located next to the inner face of the curtain wall where the inner passage of a potential gate was to be expected.

When exploration started, there was a problem of identifying the curtain wall faces. Neither in the corner, nor in the mid-way trench was identification of the lines of the wall possible. This is why after exploration of the three upper layers (each *c*. 150–200mm), both trenches were moved slightly from their original locations. In the case of the mid-way trench, the spot had to be changed twice before the identification of the face of the curtain wall was achieved. This is the reason that the trench labelled Area 3, also has Area 3A and Area 3B next to it. Only in Area 3B was the stone face of the curtain wall identified. In Area 3 and Area 3A, the remains of a mud brick construction were recorded. Trenches in Area 1 were labelled Area 1 and 1A. Area 1A is the place where the inner face of the curtain wall was found and followed down to the foundation.

Exploration and documentation of each layer was done in the same way as at Hosh el-Kab and Abu Nafisa; however, more small finds were recorded in these trenches than in the other two forts. In each of the Umm Marrahi trenches, six layers were explored, and from each of them small finds as well as charcoal samples were retrieved.

Due to the slight relocation of the trenches (Area 1 and Area 3), a decision was made to carry out additional surface cleaning to better understand the complexity of

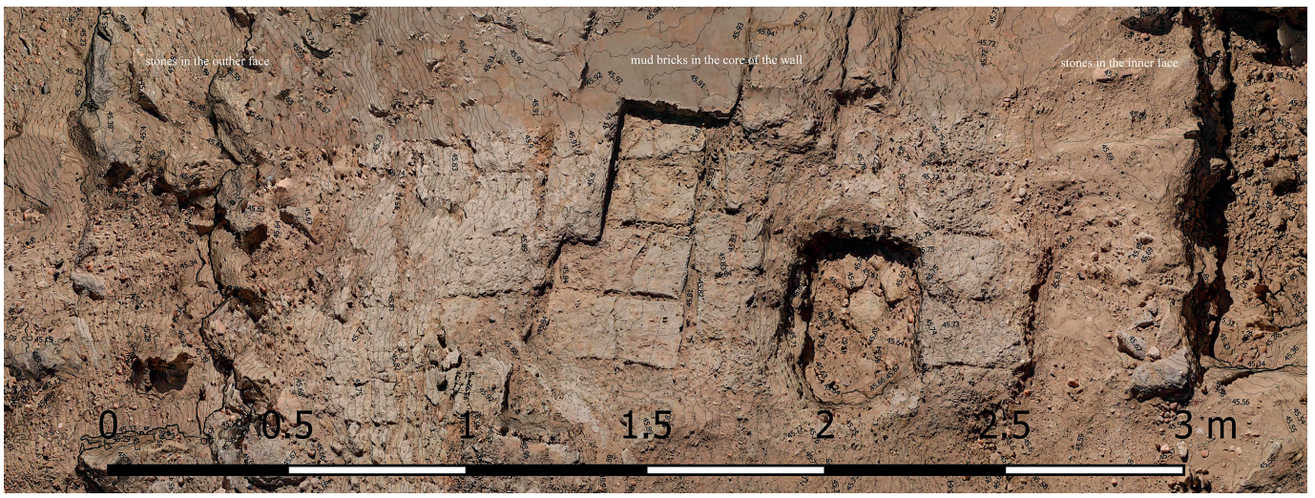

Figure 2.22. Umm Marrahi, Area 4, mud brick and stone structure of the curtain wall (photo Mariusz Drzewiecki)

the fort's architectural remains. In Area 2, a modern dig cutting through the south curtain wall and the mid-way bastion was investigated. There, one of the sections of the trench (the western profile) was cleaned recording the structure of the curtain wall core as partly being made of mud brick. In addition, the top of the wall was cleaned in Area 4 (east curtain wall, next to the north-east corner bastion) and Area 5 (north curtain wall, next to a modern path from the mosque, through the wall). In those areas, details of the wall construction were visible. The faces were made of stone, while the core was built of mud brick (**Figure 2.22**).

Aneta Cedro, the pottery specialist, made a detailed surface survey of the entire hilltop. At Umm Marrahi, the multicultural character of the site and the range of occurrence of ceramics required a slightly different approach, one that would allow for the analysis of the distribution of materials of different periods across the site. The main focus was still on the fort, where the pottery survey was conducted according to the same rules as at the two other sites (walking survey on the top of the enclosure wall, line-walking in 5m transects, marking and collecting potsherds from findspots), but apart from that, the survey was extended and covered the whole plateau. For this area, the lines of walking had to be adjusted to the natural obstacles on the rocky hilltop, so they were not as regular as inside the fort. Special attention was also given to the architectural remains or places that suggested more intense human activity. Over the whole large area of the plateau, potsherds were quite abundant and so, considering the time limits, it would have been impossible to map all spotted artefacts. The larger concentrations of pottery, distinguished and important fragments, as well as the farthest located finds, were given findspot-numbers on the map and were photo-documented directly at the site. This survey gave a general overview of the distribution and the density of potsherds of different types linked with particular periods, across the plateau. Selected potsherds were also collected for further study, with the aim of making a reference collection of the best-preserved examples of pottery types identified at the site.

The pottery assemblage from the plateau was much more complex than the materials from the two other forts. In Hosh el-Kab and Abu Nafisa, there was mostly Funj period pottery and a few Early Christian and Post-Meroitic sherds respectively. At Umm Marrahi, early Holocene, Post-Meroitic, Early Christian and post-medieval materials were identified.

Robert Ryndziewicz made a small scale geophysical test at Umm Marrahi using the same equipment and parameters as in the previous season. At the top of the hill, judging by the numerous bedrock outcrops visible on the surface inside the fort, we deduced that the natural and solid stone core of the mountain was covered with only a thin layer of eroded materials and anthropogenic layers, thus a small scale geophysical survey was conducted. The anomalies confirmed that the bedrock in the central part of the fort lies just below a thin layer of accumulated sand, and it does not bear any regular cuts of man-made origin (**Figure 2.23**).

After the completion of the geophysical prospection, and with the end of excavations at Umm Marrahi,

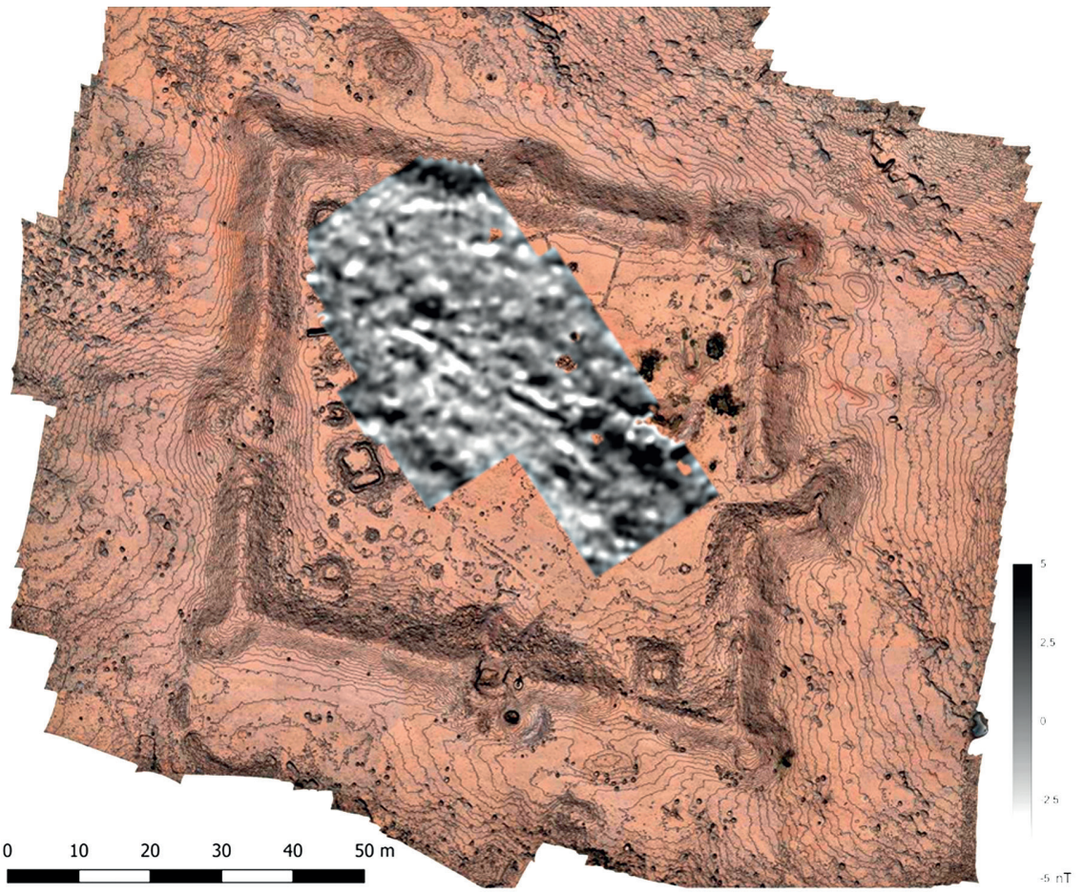

Figure 2.23. Umm Marrahi, magnetic map presenting results of the survey in the central part of the site (prepared by Robert Ryndziewicz, background image Google Earth)

Figure 2.24. Site HK 25, tumuli cemetery near Shaheinab village, all graves are disturbed by modern digging (photo Mariusz Drzewiecki)

we turned to the archaeological survey of the hill's surroundings. Unfortunately, most of the tumuli cemeteries in the area were disturbed. They are quite visible in the landscape and easily identifiable. One notable example was site HK 25, which is a large cemetery with numerous small barrows located on the southern edge of Shaheinab village (**Figure 2.24**). All graves visible on the surface had been looted, some possibly recently.

The team was joined for three days by Selma Khogli Ali Ahmed, who conducted interviews with residents of the village.[4] The aim of her activities was to record oral histories connected to Umm Marrahi and the remains of the fort.

At the end of the fieldwork four samples of mortar used in the construction of Umm Marrahi fort were collected. Two samples were taken from the inner face of the east curtain wall in trench Area 1A and two samples were collected from the western profile in the trench Area 2. The samples were sealed in tubes for optically stimulated luminescence analysis aiming to establish when the samples were last exposed to sunlight.[5] Afterwards, the trenches were backfilled and the deepest robber excavations on site were also covered.

[4] Her family is related to people living in Shaikh el-Tayib village at the bottom of Jebel Umm Marrahi, and this facilitated her work with the local community.

[5] Unfortunately, while supported by NCAM, permission to export the OSL samples to Poland for laboratory analysis was not granted as customs officials did not want to release these samples without inspecting the contents of the tubes. Other selected small finds (pottery samples, beads and all organic materials) were sent to Poland for laboratory analysis, the results of which are presented in the following chapters.

CHAPTER 3

ARCHITECTURE AND STRATIGRAPHY

Mariusz DRZEWIECKI

The following chapter relates the results of the architectural and stratigraphic observations conducted at Hosh el-Kab, Abu Nafisa and Umm Marrahi. The main source of information comes from fieldwork conducted in January/February and November/December 2018. The data is supplemented and combined with published results of previous research on the sites and the geophysical prospection conducted by Robert Ryndziewicz in 2018 (Ryndziewicz and Drzewiecki 2018; 2019). Collected together, it provides information enabling settlement phases to be established for each fort, and provides insights into the lives of their inhabitants.

In order to address the main research questions, stress was placed on the identification of occupation prior to the construction of the forts; the first phase of settlement within the forts; and the recognition of changes made to the original defences. Architectural and stratigraphic analysis can provide information concerning the sequence of occupation phases, indicating which is younger and which is older. The chronological sequence of the phases will be discussed in greater detail in Chapter 4 (pottery assemblage), Chapter 7 (radiocarbon dating) and Chapter 8 (synthesis).

Hosh el-Kab

This is the largest of the Type Two forts. It encloses an area of 0.79ha (**Figure 3.1**). It has bastions in every corner and along each of the curtain walls. There are two bastions at the north, west and east walls, while three bastions were built to reinforce the south side of the fort. The distances between the bastions are similar. They were built every 16m to 19m or 23m to 27m. Due to the poor state of preservation of the surface remains, it was impossible to establish if the bastions were erected together with the curtain walls or if they were a later addition.

The fortifications are visible on the ground as concentrations of stone debris, and only in a few places were the wall faces identified. In seven out of thirteen bastions, sections of the outer faces were documented. They were curved (**Figure 3.2**), suggesting that the shape of these structures was round in the case of the corner bastions, and semi-elliptical for the interval bastions.

Some bastions were preserved better than others. Those on the east side were more damaged. The corner bastions on the riverside were also only partially preserved. The mid-way bastion between the north-east corner and the river gate was damaged as well. Its core was rubble-free, probably as a result of modern digging.

The bastions and gates create the impression that the fort is highly regular. The south curtain wall had three bastions. The western and eastern walls each had two bastions and a gate in regular spaced intervals. Only the north wall was slightly different, with two bastions and no sign of a gate or any additional protruding architectural features. The northern bastions were both bigger, with the diameters measured across the wall reaching 5.5m to 6m. Bastions on the other curtain walls were of varying sizes, ranging from 4m to 5.5m. The distances between the two northern bastions and the corners were also longer, suggesting that from the beginning no third feature had been planned along that curtain wall. It remains a puzzle as to why it was built in this fashion. The north curtain wall was erected in the same way as the rest of the fort, suggesting that everything was built during the same construction phase. It looks as if the plan changed during the construction of the fort, or as if the fort was built by at least two teams working independently.

There are two gates, one from the desert side, and one from the river side. The latter is the least well-preserved. It is also the lowest area in the fort. It is likely that water, which accumulated in the fort during occasional rains, found its way out through the river gate. As a result, much of the remains of that gate have been destroyed. On the surface, only a gap 5.5m in width is visible. No additional structures such as *clavicula* walls nor any details of the gate architecture can be identified.

The desert gate is better preserved, which is why one of our trenches was set there (trench Area 2). The gate was visible on the surface as a 3.5m gap in the west curtain wall with an external L-shaped *clavicula* wall.

Figure 3.1. Hosh el-Kab, plan of the fort from 2011 overlaid with a contour map made in 2018 (prepared by Mariusz Drzewiecki)

Figure 3.2. Hosh el-Kab, preserved part of the curved outline of a bastion (photo Mariusz Drzewiecki)

During the excavations, it turned out that the entire area is heavily eroded and full of robber trenches disturbing the stratigraphy. The back-filled modern pits were not clearly visible on the surface. They were probably made some time ago, allowing the wind to cover and/or blur their traces on the surface. They might have been dug in modern times, or even in the Funj period since there were numerous traces of Funj period occupation on the site. This subject will be returned to later when discussing traces of the secondary use of the fort.

The L-shaped wall of the gate was preserved as an eroded single row of stones disturbed by a robber trench (**Figure 3.3**). Its poor condition did not allow for the documentation of any details of the structure.

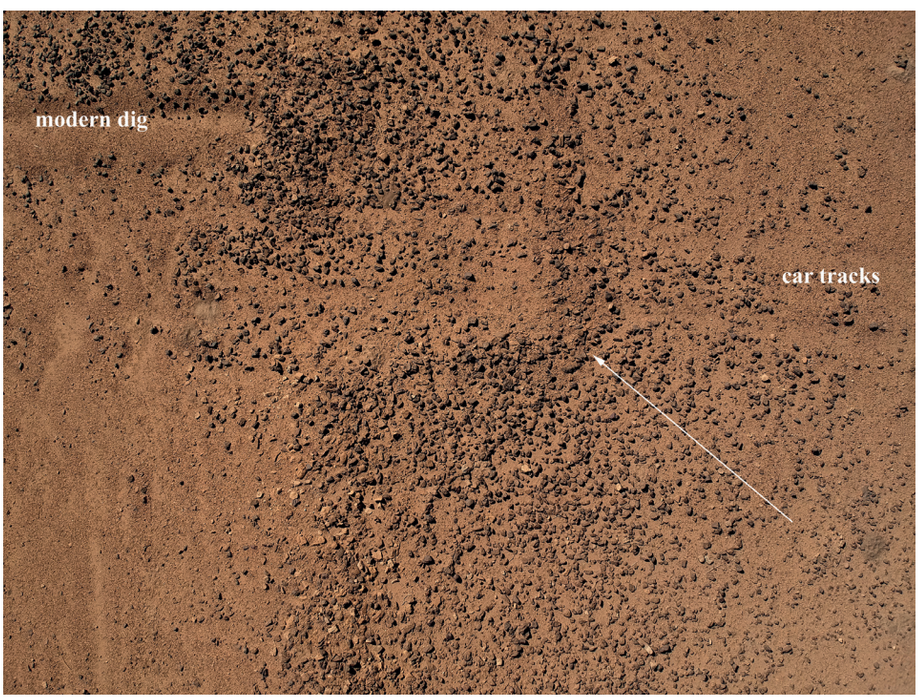

Figure 3.3. Hosh el-Kab, remains of the desert gate (indicated by the arrow) (photo Mariusz Drzewiecki)

Figure 3.4. Hosh el-Kab, remains of wood (indicated by the arrow) in Area 2, facing south-west (photo Mariusz Drzewiecki)

This is why focus was placed on the inner passage of the gate, running through the curtain wall. It was *c*. 1.5m wide. The entrance was not clearly recognisable. Heavily eroded remains of wood, which were probably part of a lower pivotal beam from the door frame of the gate, were recorded (**Figure 3.4**). A sample was taken for radiocarbon analysis.[1] Next to the beam, the edge of a mud floor was identified. A person entering the fort, after crossing the threshold, would be standing on a mud track. The end of the track at the gate was disturbed by modern digging. Where it led and how it is now preserved in the other, inner areas of the enclosure, remains unknown. The geophysical prospection did not record any anomalies that could be associated with the track. The packed mud floor was *c*. 50–80mm thick. It lay directly on the desiccated alluvial soil that constituted an archaeologically barren layer.

The remains of the curtain wall at the passage were heavily disturbed, but stone and mud brick were visible in the structure of the gate. The poor condition of the remains did not allow for us to clarify if these were the traces of subsequent phases or of a single phase in which various construction materials were used together. The use of mud brick was not noted in the structure of the curtain walls, nor in any other part of the fort. This might indicate that the desert gate, originally built of stone, was renovated using mud brick.

The foundation level of the fort in Area 2, as well as in the other investigated areas, was not deep. In the best preserved places, the architectural remains stood between 0.5 to 0.7m high. The defences were built on desiccated alluvial soil, solid and very hard, constituting a stable base for the structure. In Area 1, a thin layer of gravel (*c*. 50mm) was noted between the alluvium and the lowest row of stones (**Figure 3.5**), however, no traces of human activity that could constitute a settlement phase older than the fort, were identified.

The curtain walls were between 2.2–2.9m thick. It was only possible to measure the thickness of the walls in a few places where the inner and outer faces were preserved, and in Area 1, where a cross-section through the north curtain wall was cleared. In Area 1, the structure of the wall was also documented. The core was built from smaller stones bonded with mud mortar, while the faces were made of larger rocks. No traces of vertical masonry were identified, nor were any pottery sherds or other artefacts found in the structure of the wall. Two samples of mud mortar were taken from two places between the rocks in the core in Area 1.[2] One was analysed for macro-organic remains, but the

[1] Inv. No. P/HK1/9.

[2] Inv. No. P/HK1/11.

Figure 3.5. Hosh el-Kab, cross-section through the north curtain wall in Area 1, facing south-west (photo Mariusz Drzewiecki)

result was negative and no such inclusions were identified, thus no materials from the mud mortar were suitable for radiocarbon analysis (see further Appendix 2). This sample seemed quite homogeneous and appeared to be appropriate for OSL dating; however, it was not collected using the standard probing tubes because they did not fit between the stones. The core of the wall was constructed in such a way as to avoid leaving large gaps between the rocks, thus the possibilities to collect samples were limited.

The second sample was delivered to Gliwice Absolute Dating Methods Centre (GADAM Centre) of the Department of Radioisotopes, Institute of Physics, Silesian University of Technology. There it was inspected but the amount of material was not sufficient for the analysis. For this sample, the GADAM Centre could provide results with an error range of approximately 30% of the date.[3] Such result would not be of assistance in answering one of the main research questions, that of when the fort was built. With no possibilities of obtaining tube size samples, OSL analysis was not continued for Hosh el-Kab.

The cross-section through the north curtain wall in Area 1 also provided information about activities taking place next to the inner and outer faces of the wall. Unfortunately, abutting the inner face were traces of modern digging, while next to the outer face only the lowest occupation layer was intact. A modern robber excavation had disturbed the layers above. The lowest stratum consisted of dark brown sand and contained a small amount of charcoal. A sample for radiocarbon analysis was obtained from there.[4]

Area 1 and Area 2 did not provide much information about the occupation of the fort. The situation was different in Area 3. The excavation was set in the inner, north-west corner of the fort. There a mud brick structure was documented against the inner face of the western curtain wall (**Figure 3.6**). Next to it, in the south-east part of the trench, an intensive layer of burning was recorded. The lowest mud bricks and the burning were on the same level as the lowest stones in the curtain walls. It appeared that these were the oldest preserved traces of occupation in the fort. The layer of burning was a perfect place to collect radiocarbon samples.

[3] This means for example, that if the sample is expected to be around 1500 years old, then the potential error range would be *c*. 450 years.

[4] Inv. no. P/HK1/8.

Figure 3.6. Hosh el-Kab, Area 3, orthomosaic made at the bottom of layer 4 (photo Mariusz Drzewiecki)

Figure 3.7. Hosh el-Kab, Area 3, mud brick structure abutting the curtain wall, facing south-west (photo Mariusz Drzewiecki)

Four samples were taken, and the one with the largest fragments was sent for radiocarbon analysis.[5]

At this point, radiocarbon samples were collected from the lowest preserved levels from all three trenches. In Area 3, a sample was also obtained from the topmost occupation layer within the mud brick structure in order to establish dates for the final phase of the occupation in the fort.[6]

The north wall of the mud brick structure in trench Area 3 was 1.44m long, the east wall was 2.55m and the south wall was 1.54m (**Figure 3.7**). From the west, the structure was enclosed by the fort curtain wall. Each of the mud brick walls was slightly different, suggesting that the structure was a result of subsequent building activities. Part of the north and south walls was preserved as four rows of bricks, while the east wall and the north-eastern corner consisted of three rows. The structure was standing to a maximum of 300mm high. The lowest row in the south wall was slightly wider, creating a step or a solid foundation. There, the mud

[5] Inv. no. P/HK1/7.

[6] Inv. no. P/HK1/13. For the results of radiocarbon analysis see Chapter 7.

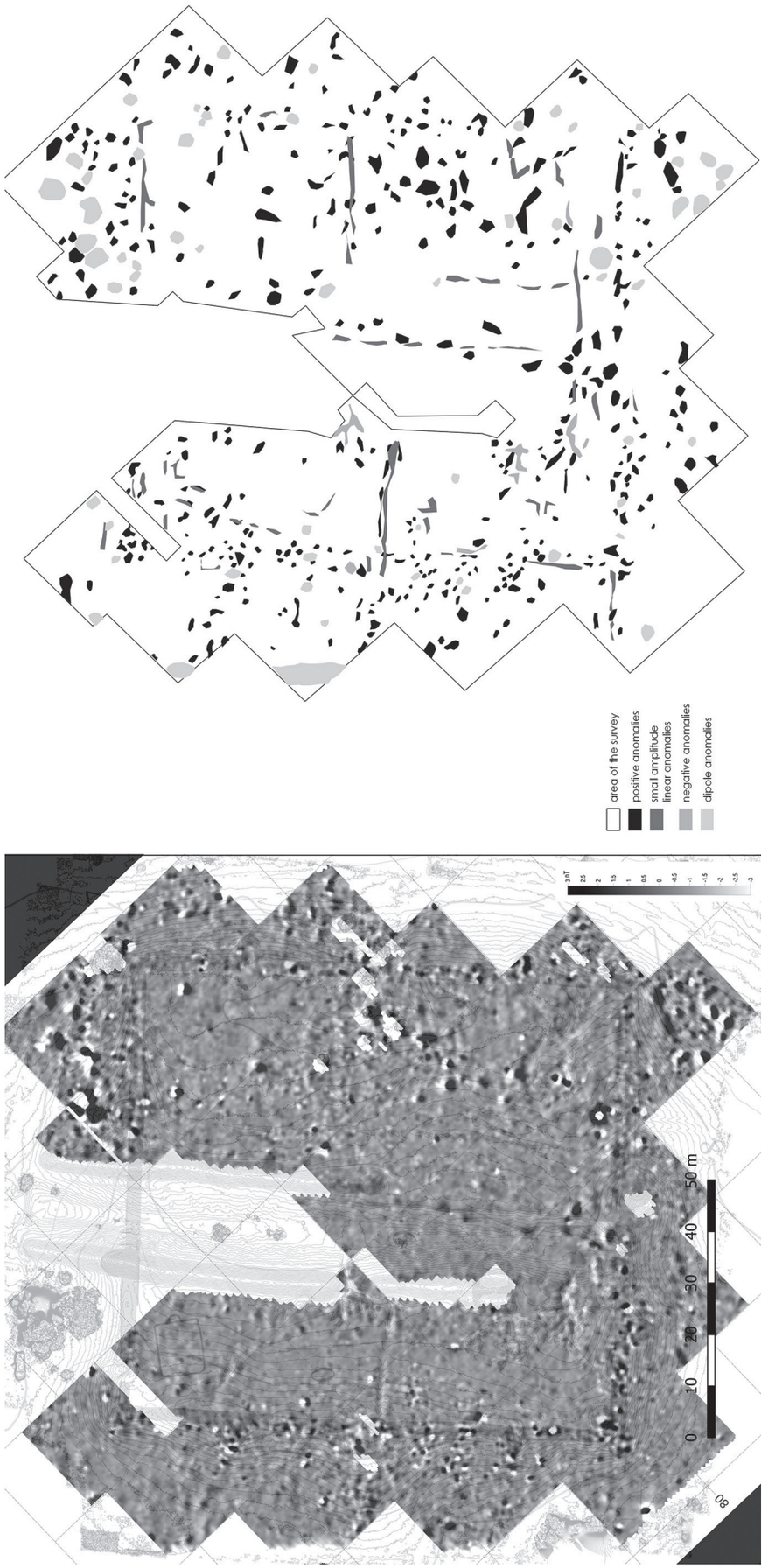

Figure 3.8. Hosh el-Kab, results of the geophysical survey.
A – magnetic map overlay contour maps; B – interpretation of magnetic anomalies
(prepared by Robert Ryndziewicz)

bricks from the inner side had traces of wear, suggesting that they might have been used as stairs.

The north wall is where the construction phases were most visible. The part next to the curtain wall had a different arrangement of bricks than the north-eastern mud brick corner. Various sized bricks were recorded from the entire structure. Some large examples were noted, *c*. 470 × 260 × 80mm and 470 × 230 × 70mm, next to regular size bricks of 370 × 180 × 60–70mm.

The soil and sand inside and outside the mud brick structure were disturbed as the result of modern digging. Only the layer of burning in the lowest levels in the south-eastern part of the trench was not disturbed. It was a situation comparable to Area 1 where the lowest layer also only remained intact. Even the north-west corner of the fort had been damaged by digging. However, both the western and the northern curtain walls were built in the same way and founded on the same level, suggesting that they were erected in a single construction phase.

The mud brick structure recorded in Area 3 had at least two construction phases, indicating that the occupation of the fort was intensive and that some buildings were erected inside, and over time, remodelled. In the first phase, it might have been a staircase, which was subsequently blocked.

Mud brick structures were also recorded during geophysical prospection of the entire area enclosed by the fortifications (**Figure 3.8**). These were erected creating a series of chambers or rooms of the same size, along the inner face of the south curtain wall and western part of the north curtain wall. The dimensions of the structures

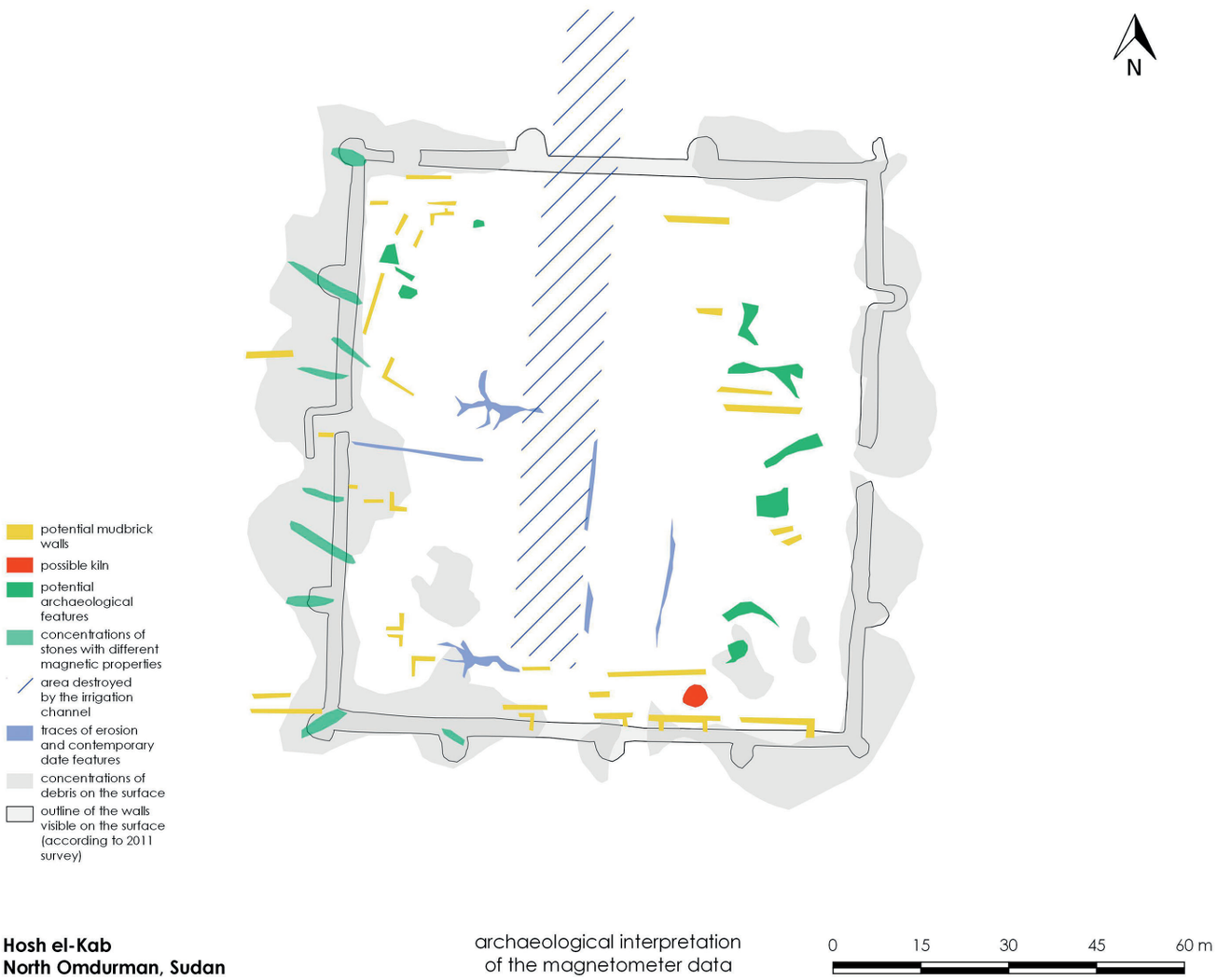

Figure 3.9. Hosh el-Kab, mud brick structures traced by geophysical methods (prepared by Robert Ryndziewicz)

cannot be precisely measured, but it seems that they were similar to or slightly bigger than the mud brick feature recorded in Area 3.

Free standing buildings were also distinguishable (**Figure 3.9**). Magnetic anomalies indicated the presence of short sections of mud brick walls, some forming 90° corners, but none revealed the full plan of a building. Most appear to be only fragments, which were arranged on an east-west or north-south axis. There were a few that had a different geographical orientation (south-west, north-east). The latter were visible only in the north-western part of the enclosure. The situation can be interpreted in two ways. First, maybe not all of the buildings inside the fort were built according to the same geographical principles or second, maybe there were two phases of settlement inside the fort. The older would be associated with the buildings erected in the same geographical layout as the fort (east-west and north-south axis) and the younger would be the diagonal arrangement. Without further fieldwork, it is impossible to decide which of the proposed solutions is correct, if either.

Three sections of mud brick walls, a few metres long, were also identified outside the curtain walls, on the west side of the fort. They had an east-west orientation, similar to the mud brick walls recorded inside the enclosure.

The results of the geophysical survey indicate that fort Hosh el-Kab was intensively occupied. The inhabitants had erected solid buildings and structures of mud brick. The observations made in trench Area 3 indicated that the structures may have been used for some time and thus adapted to changing needs.

Across the entire surface of the fort, no mud brick structures were noted. There was one feature with stone and red brick debris, as well as a few stone concentrations, particularly scattered across the southern part of the enclosure (**Figure 3.10**). The most substantial was, however, the concentration of stone and red brick debris. It was located in the south-west part of the enclosure and had already been marked on Hinkel's plan, and was visible in 2011 (Drzewiecki and Polkowski 2016, Figure 17). Unfortunately in 2013/2014, it was levelled during the irrigation earthworks. In 2018, the debris could be seen scattered throughout the area, while in 2011 it formed an oval-shaped concentration of irregular stones with some red bricks *c*. 0.5m high

Figure 3.10. Hosh el-Kab, aerial photo of the site. The arrows indicate the stone structures in the southern part of the site, facing north-west (photo Mariusz Drzewiecki)

Figure 3.11. Hosh el-Kab, the remains of the stone and red brick building in 2011, facing west (photo Mariusz Drzewiecki)

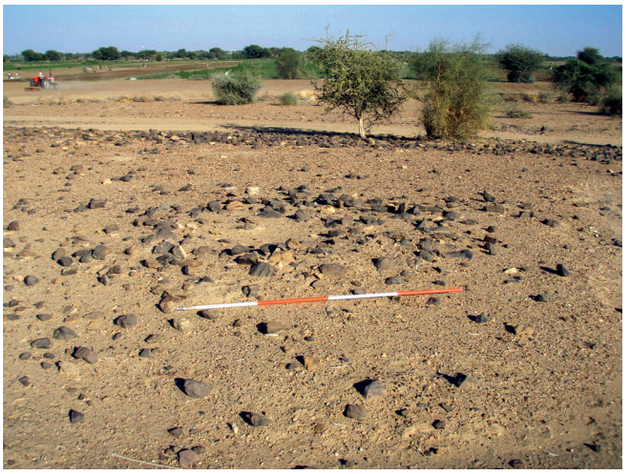

Figure 3.12. Hosh el-Kab, the largest feature in the secondary settlement in the south-eastern part of the fort, facing east (photo Mariusz Drzewiecki)

and 12 × 7m in diameter, with the longer axis oriented east-west (**Figure 3.11**). In 2011, three large excavated holes had disrupted the integrity of the structure, bringing to the surface small fragments of thick lime plaster. In 2018, the fragments of plaster were still visible in the area. A sample was collected and analysed (see Chapter 6 for results).

Other stone structures on the sites were less substantial. A rectangular stone enclosure (10.5 × 9m) was visible in the north-west part of the fort. This was the same corner in which the Area 2 trench was located, however, there was no overlap. The stone feature appeared as a surface structure. It was delineated by single row of stones. It had a niche in the east wall, suggesting a religious function, and it looked like an open mosque, a relatively common feature in the Middle Nile region. It may have been created by travellers briefly staying on the site. Sometimes such open mosques are in use over a long period of time. An open mosque in the fort would suggest that, at least for a brief time, it was occupied in the Islamic period.

In the south part of the fort, six small and medium sized concentrations of stone were observed on the surface (**Figure 3.12**). Two overlapped the remains of the defences, indicating that the place was occupied after the fort fell into ruin. The state of preservation of the fortification at that time must have been similar to that seen before 2013/2014, thus indicating that the occupation had nothing to do with the defensive potential of the fort. The overlapping structures are the remains of a secondary settlement on the site, which does not have much in common with the original defensive role of the fort.

Four out of six stone structures were concentrated in the south-eastern part of the fort. These could be the remains of a small domestic unit. There was one medium size oval structure, *c*. 3m in diameter. It might have been the remains of the main building, used as a shelter and resting place during difficult weather conditions. The other three structures are smaller in size, ranging from 1.1m to 1.4m in diameter. These might be the remains of storage facilities. Most everyday activities probably were conducted outside and around the buildings, as suggested by a concentration of pottery fragments scattered throughout this area.[7] The remains of the fort were a source of building material for the settlers. It is possible that the easy access to raw building materials was one of the reasons for this secondary occupation.

The geophysical prospection of the south-east part of the fort recorded a high, concentrated magnetic anomaly next to the stone structures. This might have been a kiln or place where a substantial layer of burning accumulated. Whether it can be associated with the original settlement in the fort or with a later occupation remains an open question. It is also difficult to say if all six stone structures and the open mosque were constructed and used at the same time and by the same people, however, all activities connected with these features took place after the fort fell into ruin.

Based on the observations presented above, the following settlement sequence of occupation can be suggested. No trace of human activities prior to the construction of the fort were identified. The walls were

[7] For detailed analysis of the ceramic materials see Chapter 4.

erected on desiccated alluvial soil and the best preserved sections stand up to 0.7m high. During surface inspection of the curtain walls, and in the sections which were excavated, no traces of architectural phases were identified. Only in the construction of the desert gate where the use of mud brick next to stone material was observed, was there an indication that some sort of gate restoration might have been undertaken.

Inside the fort remains of buildings/structures made of mud brick, red brick and stone were documented. Mud brick architecture was uncovered in trench Area 2. The structure had two construction phases and the lowest row of bricks was on the same level as the foundation of the fort. Next to it, a layer of burning was recorded. These were the most solid traces that could be connected stratigraphically with the oldest preserved occupation of the fort. In other trenches the earliest preserved layers, while less substantial, also provided organic samples for radiocarbon dating.

Results of the geophysical prospection suggest that there were mud brick structures erected against the inner faces of the curtain walls, as well as, free standing buildings. Architectural remains were also recorded outside the enclosure, directly to the west of the fort.

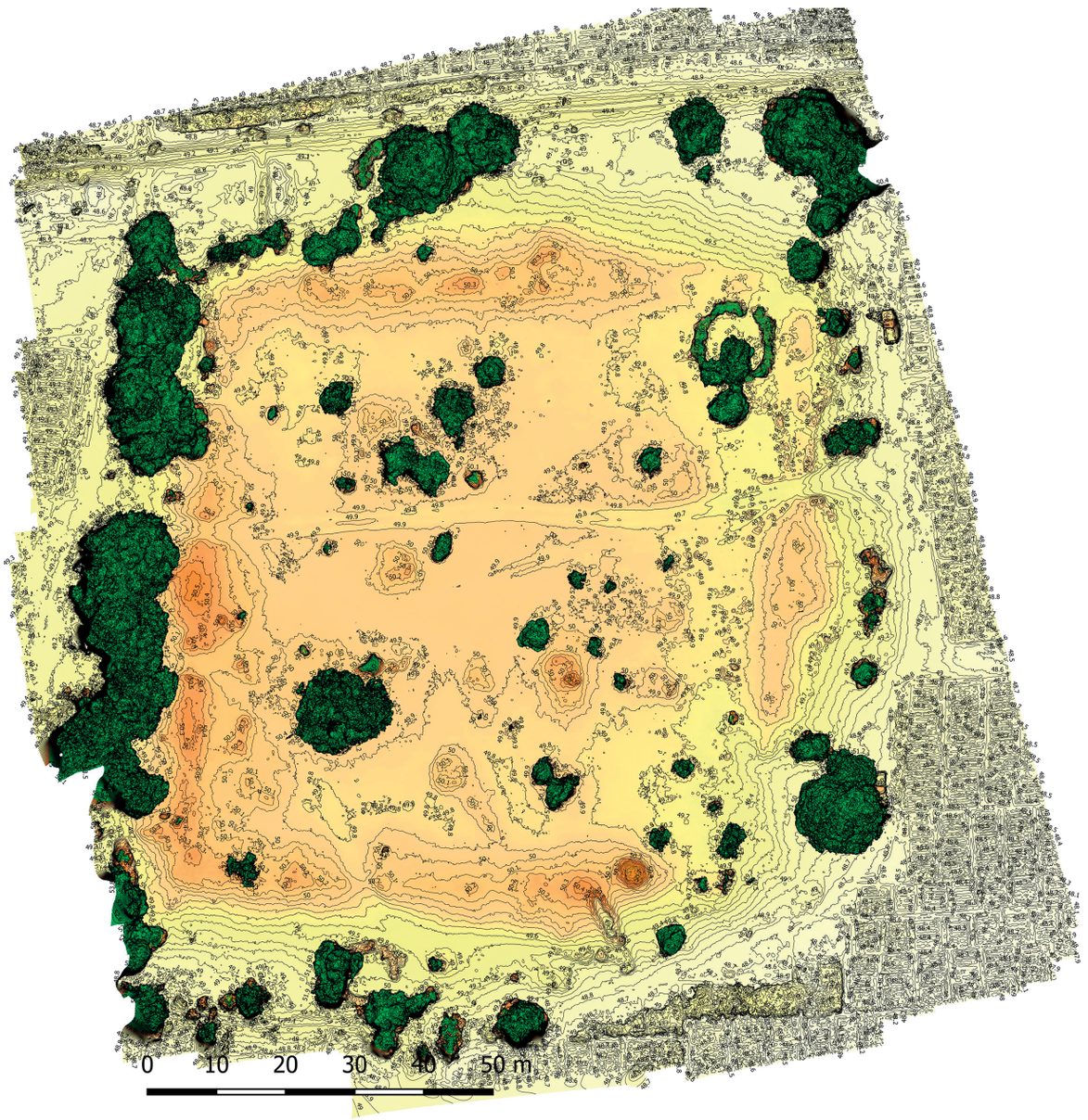

Figure 3.13. Abu Nafisa, digital elevation model and contour map of the site (prepared by Mariusz Drzewiecki)

Most stone structures visible on the surface inside the fort are the remains of a secondary use of the site when the defences were already heavily eroded. One, the most massive feature where some red brick fragments were also noted, is an exception. Fragments of lime plaster found on its surface indicate that this might have been a well-appointed building. With the longside oriented on an east-west axis, it might be the remains of a small church.

During the excavations numerous pits disturbing the stratigraphy were recorded. Their traces were not clearly visible on the surface, suggesting that the digging was done some time ago, perhaps even during the secondary occupation of the fort.

Figure 3.14. Abu Nafisa, the lines of stones are the remains of the curtain wall faces, facing north (photo Mariusz Drzewiecki)

Figure 3.15. Abu Nafisa, Area 2, the single rows of upright stones are the remains of the curtain wall, south-west corner (photo Mariusz Drzewiecki)

Abu Nafisa

The fort is now surrounded by fields. Local farmers used it as a rest place and a grazing area for their livestock, thus small trees and bushes were allowed to grow on the site. This was the main obstacle encountered during the geophysical survey. The entire surface was covered with irregular stones. In some parts of the site larger concentrations of stone material are visible. The best preserved features were:

– the oval grave (9 × 3m) of Sheikh Abu Nafisa. The superstructure of the grave is a ring of stone *c*. 0.7m wide and 0.7m high,
– an almost square concentration (5.2 × 4.9m) of irregular stones *c*. 1.2m high. It is 5m north-east of the sheikh's tomb. One face of a stone wall protrudes out from the debris. It is 2.8m long and oriented almost on a north-south axis. The feature seems to be connected with the grave. It may be a collapsed building from the time when Abu Nafisa was living on the site.

These two features are in a much better state of preservation than the other structures visible on the surface of the site (**Figure 3.13**). They overlap the remains of the south curtain wall of the fort indicating that they are remains of a secondary settlement on the site, from a time when the fort was already in ruins.

The curtain walls are preserved as linear concentrations of stone debris, which consist of boulders lying on, or protruding from, the ground. In a few sections, lines made of stones are visible, pinpointing the outer or inner faces of the walls (**Figure 3.14**). It was possible to measure the thickness of the walls in a few places, where traces of both the inner and outer faces were visible. The curtain walls were between three and four metres thick and in all preserved areas made using the vertical masonry technique. The condition of the defences is extremely poor. Excavations in the two western inner corners revealed that the walls were preserved as a single row of stones (**Figure 3.15**). This was the lowest part of the foundation of the fort. No trace of mud mortar was observed. This could, however, be the result of the poor condition of the remains.

The debris recorded on the surface suggested that much of the construction material must have been removed or washed away by the river. In nearby Hosh el-Kab, the walls were preserved to a maximum of 0.7m in height. If collected together, the debris on the surface of Hosh el-Kab would probably constitute an

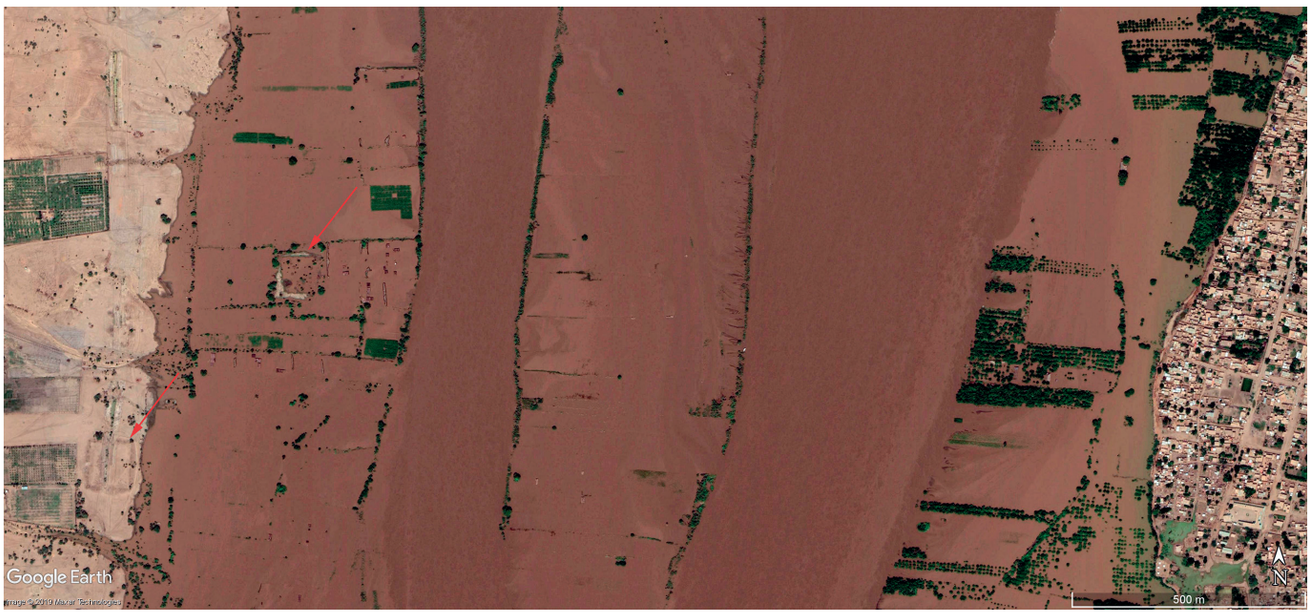

Figure 3.16. Abu Nafisa during the flood of 2019 (Google Earth)

additional 0.7m to the height of the defences. Thus Hosh el-Kab can be considered as a site that has suffered from erosion and where some building materials might have been taken by residents of the nearby villages. When compared with Abu Nafisa, both the amount of debris remaining and the state of preservation, indicate that intensive and destructive activities have occurred on the site.

The foundations of the fort, as seen in our trenches, were set in alluvial soil. The ground was hard, thus difficult to excavate; however, the level of moisture was higher in comparison to the desiccated soil below the foundations of Hosh el-Kab. Abu Nafisa is approximately 200m from the Nile, as measured at the beginning of 2012. The site is not elevated. The surrounding fields are *c*. 5m above the Nile (as measured in winter 2012), while the stone remains of the fort are 0.5-1m higher, thus 5.5-6m above the river (see Figure 2.11).

During the great river flood of 2019, water covered all of the fields surrounding Abu Nafisa. This is clearly visible on the Google Earth image (**Figure 3.16**) where standing water can be seen both inside and outside the fort. Only the highest remains of the enclosure wall were above the water. Judging by the condition of these remains in 2018, it seems that this is not the first time that Abu Nafisa has suffered from flooding. The geophysical survey indicates that alluvial deposits are present across the entire surface of the fort, inside and outside. Why was it built in an area subject to flooding? There are a few potential answers to this question. They are briefly presented here:

1) Perhaps the modern Nile channel did not flow in the same place as in the past. When the fort was built, the river might have been much further from the fort with no threat of flood at that time;
2) Those who built the fort may not have realised that there might be issues with the water. Very high rainfall happens only from time to time, and sometimes a gap between high floods might last for a few generations so the probability of such an event could have been considered extremely rare. Modern normal floods, as observed on subsequent Google Earth images, did not reach as close to the site due to the steep river bank;
3) Those who built the fort were aware of the water problem, but they only needed the fort for a short time.

The investigations at Hosh el-Kab are key to understanding the builders of the fort at Abu Nafisa. During the flood in 2019, the location of Hosh el-Kab proved to be perfect. It was directly on the edge of the inundated area. The people who built Hosh el-Kab were aware of the hydrological situation in the region. Did they learn the hard way by building their first fort (Abu Nafisa) in the wrong place? The chronology of the forts is integral to understanding the situation. This issue will be discussed in detail in Chapters 7 and 8.

The south-east corner of the fort is not traceable on the surface. Other corners are easily identifiable and were reinforced with bastions. The best preserved is the one in the south-west corner. It has stones creating a curved layout indicating that the bastion was round in shape. This is also the only place where potential phases of the fort construction have been identified. There are two round outer faces of the bastion visible. It seems that the original bastion was smaller, *c*. 4.6m in diameter, and later it was enlarged to *c*. 7.6m in diameter. These hypothetical first and second phases were both built using vertical masonry (**Figure 3.17**).

Other protruding architectural features were also recorded in the middle of the western and eastern curtain walls. Their state of preservation was poor. They consist of irregular stone debris so it is difficult to determine whether they were bastions, or gates equipped with additional defences.

There are four gaps in the curtain walls; two in the west, one in the south and one in the east. It is impossible to say even if one or two may be the remains of gates. All of the gaps are situated where modern paths and tracks cross the site, so they might simply be modern breaks in the structure of the walls. The modern tracks are features clearly visible on the magnetic map.

Inside the fort, thirteen concentrations of stone debris were identified (see Figure 2.11). They were rounded or elongated in plan. It is impossible to say if they are remains of structures built during the first phases of the fort, or if they are later additions. They are in a worse condition than the grave of Abu Nafisa and the remains of the nearby building, thus suggesting that the features might be older. The geophysical survey does not supply any additional data on these features.

Figure 3.17. Abu Nafisa, south-west corner bastion with traces of rebuilding (photo Mariusz Drzewiecki)

In the trenches, traces of settlement were scarce. In trench Area 1, the few small finds were mixed with top soil and disturbed by the charred roots of a tree that had stood in this place in the past, most probably long after the fort fell into ruin. Except for the curtain walls,

Figure 3.18. Abu Nafisa, Area 2. The arrow indicates the traces of a fireplace below the foundation of the fort, facing north-west (photo Mariusz Drzewiecki)

no traces of architecture were noticed in the trench. Two charcoal samples were collected from the dig and one was sent for radiocarbon dating.[8]

In the second trench (Area 2), the situation was more complex (**Figure 3.18**). The state of preservation of the curtain walls was similar to the one documented in Area 1. However, below the foundation of the fort, single pottery sherds were still being recorded in the alluvial soil, thus the excavations were continued and *c*. 340mm below the foundation of the defences, a semicircular concentration of stones was recorded. It was 1.5m in diameter and *c*. 100mm thick. A cut was made to examine the feature in section. Below the stones (layers 6 and 7) both intensive and superficial traces of burning were recorded. Traces of fire were also visible on the muddy alluvial soil, which due to the heat, had changed colour to various shades of red. Below the stones, a few pot sherds and faunal remains were recorded. It appears that the feature was a fire place. Judging by the stratigraphy, it was older than the remains of the fort, indicating that there was some sort of human activity on site before the construction of the fort, thus the materials and samples from this layer are important data as they can provide *terminus post quem* for the fort's construction. Four charcoal samples were obtained from the feature and three were sent to Poznan Radiocarbon Laboratory.[9]

In conclusion, there were at least three phases of settlement on the site. The oldest were recorded in Area 2, below the foundation of the fort. There a substantial fireplace was recorded. The defences were built later, and were occupied for some time as there are traces of reinforcement of the south-west bastion. Much later, when the fort was already in ruin, Sheikh Abu Nafisa chose to live in this place and was subsequently buried there.

There are thirteen concentrations of stone debris inside the fort. It is difficult to associate them with any of the settlement phases. Judging by the state of preservation, they are most probably older than the remains of the Sheikh Abu Nafisa phase. The site has suffered from high river floods. Alluvial deposits cover the entire surface as indicated by the geophysical prospection. The most recent flood was a few months after excavations were finished, as seen on the Google Earth images.

Umm Marrahi

The fort is regular and quadrilateral in shape. It is approximately half the size of Hosh el-Kab, enclosing 0.42ha. It is also the best preserved fort (**Figure 3.19**) probably due to its location on a hilltop. The architectural remains are still standing up to 2.5m high in places, however, the upper parts of the walls are much eroded. The fallen stones covered the lower sections of the defences making any detailed observations almost impossible without removing the debris.

Small sections of the faces of the walls were visible in 2018, allowing us to measure the thickness of the curtain walls. It was 3m wide in these particular places. The team from the University of Khartoum, which conducted research here in the 1970s when the fort was in better condition, suggested that the walls were between 2.9 to 4.6m thick (El-Hassan 2006, 32). They also recorded remains of a parapet walk on top of the walls. In 2018, no traces of such a feature remained.

The faces of the curtain walls were built of stone. In trench Area 1A and Area 3B, they were preserved to 1.4m high (**Figure 3.20**). Vertical masonry was not noted. The gaps between the stones were quite large, reaching 100mm, and were filled with mud mortar. No pottery sherds or macro organic materials were noticed during inspection of the faces, thus raising the hope that the material might be suitable for OSL dating. Although the gaps between the stones in the curtain wall faces were much wider that those inspected in Hosh el-Kab, metal probing tubes still could not be inserted. Instead, 80mm diameter plastic tubes were made and due to their higher elasticity, it was possible to insert them between the stones. Four mud mortar samples were obtained, two from Area 1A and two from Area 2.[10]

The enclosure was strengthened with four angle bastions and two mid-way bastions in the north and south curtain walls. These were all rectangular in shape, according to Ahmed Abuelgasim El-Hassan (2006, 33). In 2018, they were visible on the surface as large concentrations of stone debris with parts of the wall core made of mud brick.

There was a large gate in the middle of the east curtain wall, equipped with an L-shaped outer wall protruding *c*. 9m from the line of the curtain (**Figure 3.21**).

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[8] Inv. no. P/AN/15.

[9] Inv. nos P/AN/19, P/AN/20, P/AN/22.

[10] Area 1A: Inv. nos P//UM/51 and P//UM/52; Area 2: Inv. nos P/UM/53 and P/UM/54. Unfortunately, as mentioned above, permission to transport the samples for analysis to Poland was not forthcoming and further OSL analysis was suspended.

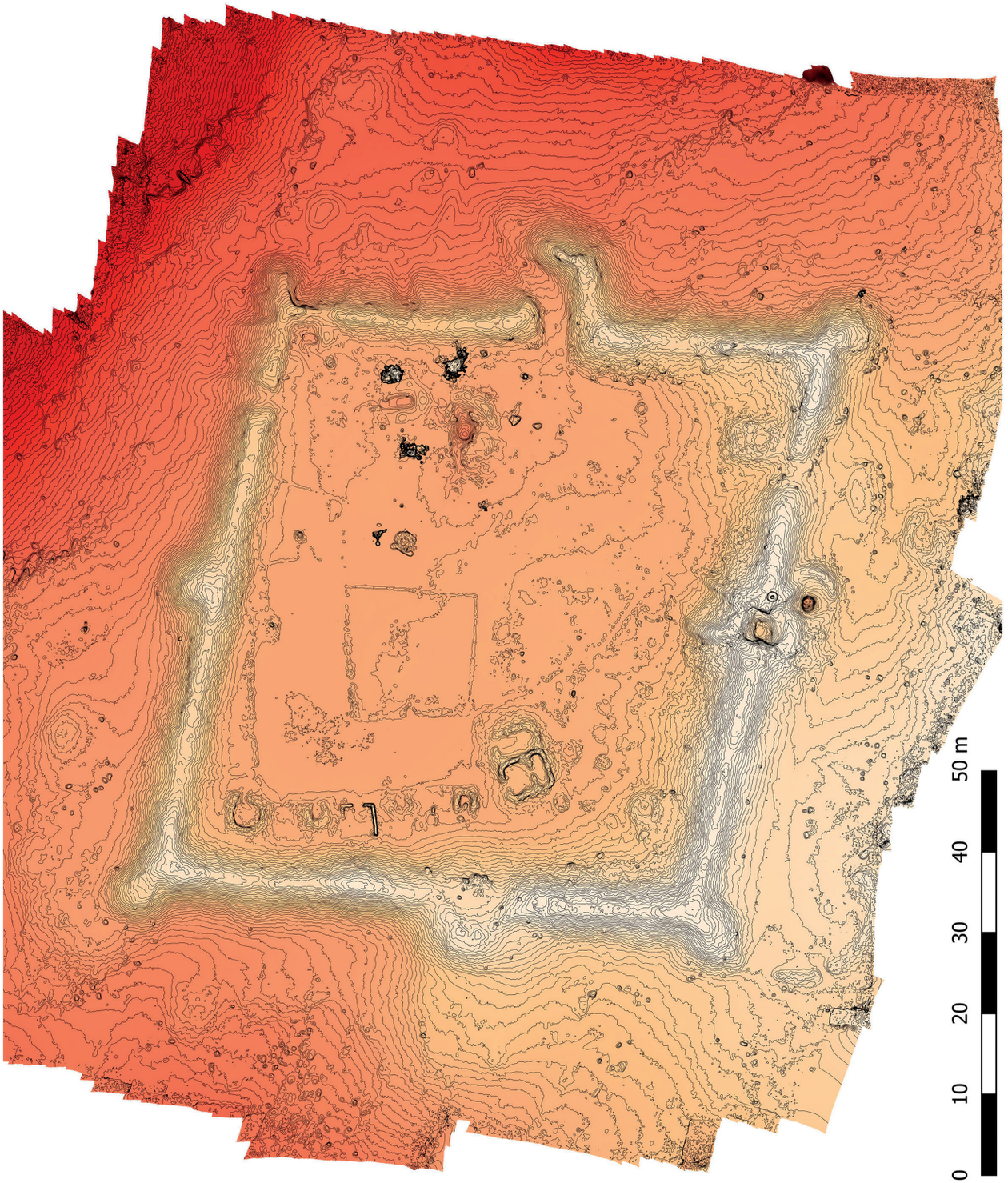

Figure 3.19. Umm Marrahi, digital elevation model of the site with contour map (prepared by Mariusz Drzewiecki)

Figure 3.20. Umm Marrahi, stone inner face of the east curtain wall in Area 1A (photo Mariusz Drzewiecki)

Figure 3.21. Umm Marrahi, the east gate in 2018 (photo Mariusz Drzewiecki)

Figure 3.22. Umm Marrahi, bedrock in trench Area 3B, facing south-west (photo Mariusz Drzewiecki)

Due to recent car traffic through the gate, no traces of the threshold or doorposts were identifiable. The inner passage was seen as a 2.5m gap in the curtain wall, while the outer entryway had a 3.8m opening.

The fort was built on bedrock, which was recorded in trenches Area 1A and Area 3B (**Figure 3.22**). The stone surface of the mountain was also visible in a few places inside and outside the defences without prior excavation. Before the construction of the walls, the surface was probably prepared and cleaned, however, the bedrock has numerous large and small cracks. It seems that the surface of the hill was levelled and the crevices filled with stones, soil and various archaeological materials. In Area 3B, in the lowest level (layer 6), seven Post-Meroitic sherds and eleven fragments of a single Mesolithic/Neolithic pot were recorded.[11] In the lowest levels in Area 1A, only Post-Meroitic material was found (see Chapter 4).

The core of the enclosing wall was built of irregular stones up to *c*. 1m in size (recorded in Area 2). Above that, the core was made of mud brick and stone material bonded with mud mortar (recorded in Area 2, 4 and 5). Where used, the mud brick did not constitute the whole core of the curtain walls. In Area 2, the lower six rows of mud brick were *c*. 2.5m wide. Later, they were made narrower with the next seven rows being *c*. 1m wide. The entire mud brick structure in profile appeared L-shaped, with the highest part directed towards the outside of the enclosure (**Figure 3.23**). It was first thought was that this might be the remains

[11] Inv. no. UM/18/184.

Figure 3.23. Umm Marrahi, Area 2, north profile showing the mud brick and stone core of the curtain wall (photo Mariusz Drzewiecki)

of the parapet walk. However, on the sketch of a cross-section through the north-east corner drawn during the research in the 1970s, the lower five rows of mud brick were approximately one-metre-thick, while the upper six rows were twice as wide, creating a T-shaped structure (El-Hassan 2006, fig. 21).

Surface cleaning in Areas 4 and 5 revealed the presence of mud brick and stone material, indicating that the core of the entire enclosure was built using a mixture of both. The lack of regularity in the composition might indicate that those building the defences were in a hurry. They might have wanted to build the walls as quickly as possible, using all resources available at the time.

Observation conducted in Area 3 added information on the use of mud brick in the construction of the fort. A discontinuity in the structure of the inner face of the curtain wall was identified. In Area 3B, a well-preserved, stone wall face was recorded. In Area 3 and 3A, which were directly to the north, the stone face was not detected. Instead a heavily eroded mud brick construction filled the gap (**Figure 3.24**). In all other investigated places, the inner face of the wall was made of stone, making this part of the fort unique.

Why was mud brick used in this particular section of the fort to a greater extent than elsewhere? There are at least three possible explanations. The first is that the inner face of the wall originally was built of stone. At some point it became damaged and was subsequently restored with mud brick. The second solution is connected with the generally lower height of the mud brick structure. This area might have been an accessway to the top of the curtain walls, having been a ramp or perhaps an eroded staircase. The third explanation is connected with the location of the mid-way bastion on the outer face of the east curtain wall. It was described as a bastion by O. G. S. Crawford (1953a, 39) and A. A. El-Hassan (1979, 59–60); however, upon closer examination it is a little bigger than the other mid-way bastions in the fort, and in contrast to the others, was not completely covered with stone debris with its central part being rubble-free. Perhaps these are the remains of yet another gate that was blocked with mud brick? Further research is required to verify which of these solutions, if any, is correct.

There is a semicircular wall (*c*. 27m long) attached to the outer face of the south-west corner bastion. It is *c*. 1.5–2m in thickness and preserved as a concentration of stone debris *c*. 0.5m high. It has two narrow passageways

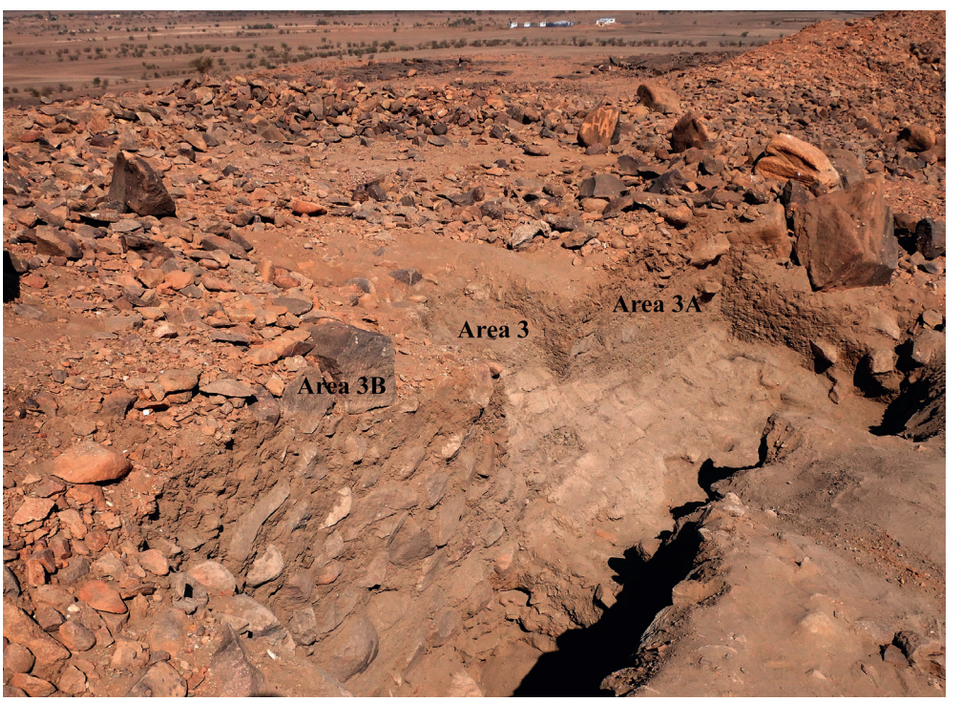

Figure 3.24. Umm Marrahi, Area 3: 3A with mud bricks and 3B with stone casting of the curtain wall, facing north-west
(photo Mariusz Drzewiecki)

Figure 3.25. Umm Marrahi, semicircular stone wall attached to the south-west corner bastion (photo Mariusz Drzewiecki)

(*c*. 0.9m wide each), one next to the corner bastion and the second in the middle (**Figure 3.25**). It is difficult to say if they are the original features of the additional wall or simply a result of modern pathways crossing this part of the site.

El-Hassan (1979, 177) dated all defensive features visible on the entire plateau to the same period as the fort (**Figure 3.26**), however, the semicircular wall is obviously a later addition to the corner bastion. Its structure, arrangement and similar state of preservation associate it with the remains of the wall following the western edge of the plateau, indicating that both features might be later than the fort itself.

To conclude, the fort seems to be a single-phase enclosure. The mud brick structure in Area 3 may be the only sign of restoration carried out on the defences. The surface of the bedrock probably was prepared before the construction of the fort, but a few Mesolithic/Neolithic potsherds from an earlier settlement phase were identified in its cracks. When the fort was standing, an addition was made to the south-west corner bastion, and a wall was built along the western edge of the plateau. Whether this was done in the early medieval period or later remains a puzzle.

Inside the fort, numerous stone structures are visible on the surface (**Figure 3.27**). All are the remains of modern activities on the site. The local Sufi brotherhood (*Tarika Tayibiya*) have been using the remains as a place of religious ritual. During the fieldwork the team witnessed individuals and small groups coming to the fort to pray and perform rituals. Furthermore, geophysical survey conducted on a small part of the central area inside the fort, where the surface was rubble-free, indicates that the cracked bedrock is just below the thin layer of the windblown sand.

There are four types of stone features in the fort:

1. Short words in Arabic laid out with stones, usually the names of God. This was the most common feature.

2. Small piles of stone, less than 1m in diameter and up to 0.5m high, sometimes with a large boulder on top. Some of the top boulders have an opening with worked smooth edges (**Figure 3.28**), which are used in ceremonies for obtaining a blessing (Arabic: *baraka*).

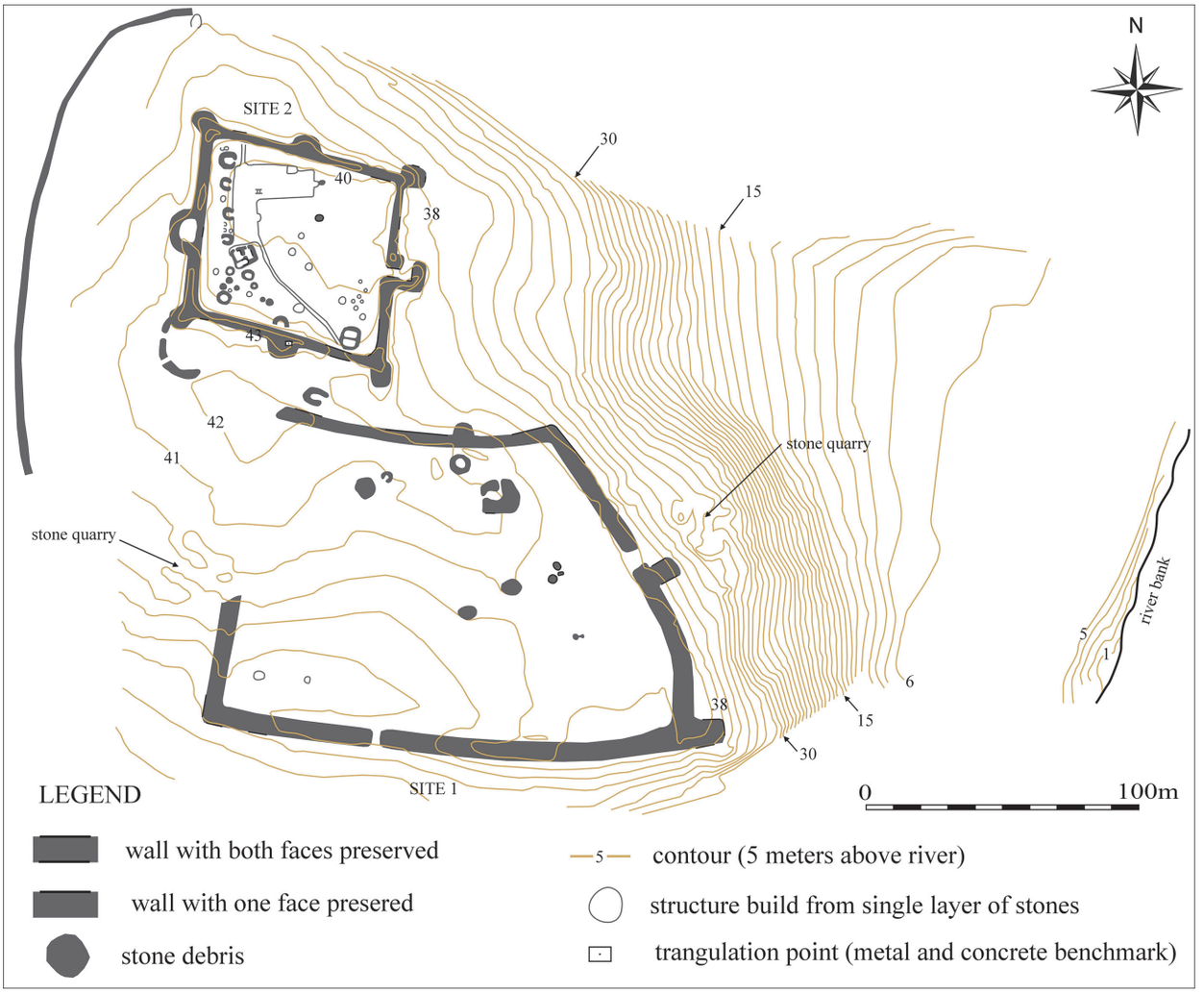

Figure 3.26. Umm Marrahi, architectural remains on the entire plateau (prepared by Adrian Chlebowski and Mariusz Drzewiecki)

Figure 3.27. Umm Marrahi, architectural remains inside the fort in 2012, facing east (photo Mariusz Drzewiecki)

Figure 3.28. Umm Marrahi, stones used in *baraka* rituals (photo Mariusz Drzewiecki)

During the act, the shallow surface of the boulder is abraded with a smaller stone, in a way similar to the use of a quern and a pestle. The difference is that in this situation the stone used as a quern is soft, so the friction creates a powder. The powder can be rubbed into skin on the face, or if needed, in a place which is the source of a pain, thus transferring *baraka*. The depth of the holes in the boulders can vary. In some smaller stones a hole pierces them all the way through, while in others it can be a hollow only a few centimetres deep.

During our stay at the site we witnessed a unique situation where an elderly lady performed a *baraka* ritual at a small opening (*c*. 150mm in diameter) in the surface of the bedrock. She reached inside, inserting her right hand up to the arm. The hole was *c*. 0.8m deep. *Baraka* rituals were also performed outside the fort, *c*. 40m north of the north-west corner bastion. The place is marked by a large boulder with polished top and side surfaces. The stone is large (*c*. 3m in diameter) and its polished white face is easily recognisable among the dark, sun-burnt surroundings. It is also visible on the Google Earth images as a white spot next to the north end of the wall following the edge of the plateau. The excavation team witnessed a group of women hand-polishing the stone, lying on its flat top and whispering.[12]

3. Larger and smaller buildings inside the fort. In local oral history, these were built by sheikhs and pilgrims who wished to stay on the top of the hill for a longer period. The seven buildings in the western part of the enclosure next to the mosque, were built, according to our local workers, by seven subsequent sheikhs of *Tarika Tayibiya*.

4. Areas where loose surface stones were swept away, creating rubble-free zones with small piles of stone along the edges. In this way an open L-shaped mosque was made in the north-west part of the fort and two paths led to it. The path from the north, across the northern curtain wall is 6.2m long. The second is much longer (50m) and leads from the south curtain wall to the mosque. The mosque was mentioned by Crawford in the 1950s (Crawford 1953a, 39). In the oldest image of the fort available at Google Earth (taken in 2004, **Figure 3.29**), it was rectangular in layout measuring 13.5 × 8.5m with a 1.5m wide and 1.3m deep mihrab niche in the east wall and since then it has been remodelled a few times. Before the end of June 2005, the mosque had been extended, reaching 27 × 11m. A new and larger niche (2.5m wide and 2.5m deep) was also made. At that time, the northern path was created. Before August 2009, an extension toward the east was made, resulting in the L-shape of the mosque observed during the fieldwork in 2018. In 2017 and 2018, additions in the form of stone lines were also made, enclosing the

[12] For additional information see Drzewiecki 2019.

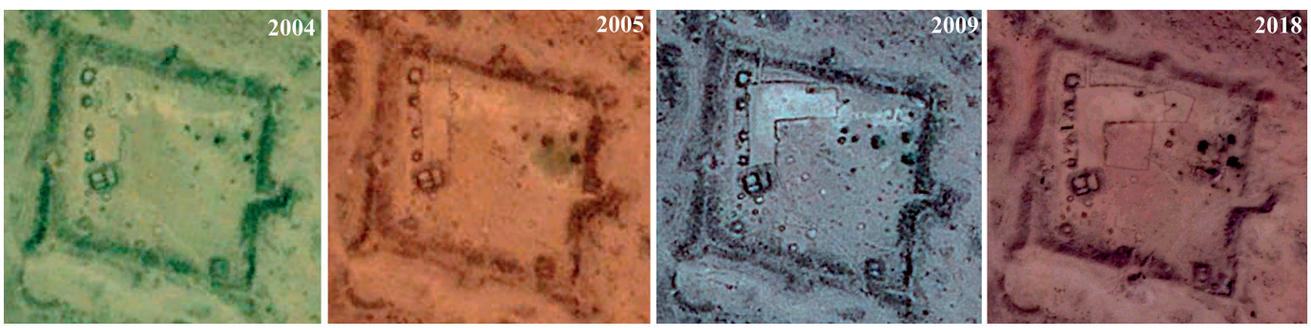

Figure 3.29. Development of the open mosque in the fort at Jebel Umm Marrahi (Google Earth imagery)

areas next to the east side of the mosque. In those areas, however, the surface was not cleared of loose stones. It seems that the dynamics of change to the mosque increased after 2004.

No architectural remains of buildings were noticed in our trenches inside the fort, however, a large number of small finds were recorded (for details see Chapter 4). In the upper layers (layers 0–3) the materials were mixed, but in the layers beneath (layers 4–6), the small finds in both trenches lacked post-medieval and modern intrusions. In Area 3B, layer 4 began beneath stone rubble (designated layer 3). This debris was the result of a curtain wall collapse that occurred prior to our excavations, and had sealed the layers below (**Figure 3.30**). The lowest layers in both trenches were rich in small finds (mostly pottery sherds), suggesting that the fort was used intensively for some time. At the bottom of the trench in Area 3B, a large and extensive layer of burning was recorded with faunal remains (see Chapter 5), pottery sherds (see Chapter 4) and organic material (see Appendix 2). It had been used as a place for food preparation.

To summarise, the following phases of settlement were identified:

1) The early Holocene settlement. This had been mostly removed when the hill surface was prepared for the construction of the fort. Only a few pottery sherds from this phase were recovered from the lowest layer (layer 6) in Area 3B;
2) The erection of the fort and subsequent intensive occupation as recorded in layers 4 to 6 in both trenches. No trace of architectural remains inside the fort can be clearly associated with this phase;
3) An additional wall was attached to the south-west bastion. It is probable that the wall following the western edge of the plateau was also constructed at this time;
4) The fort was no longer maintained and the walls fell into ruin. According to local oral histories, the local Sufi brotherhood was using the remains as an area for their rituals and prayers by the 19th century;
5) In the 21st century, religious architecture began further developing inside the ruined fort.

Figure 3.30. Umm Marrahi, stone debris sealing rich pottery layers beneath (photo Mariusz Drzewiecki)

CHAPTER 4

THE POTTERY ASSEMBLAGE: BETWEEN FUNCTION AND CHRONOLOGY

Aneta CEDRO

Objectives and methodology

Research on pottery was intended to form a substantial part of the project *Did Meroitic rulers build fortifications?* Planned as one of the methods to establish the dates of the creation of the three forts, Hosh el-Kab, Abu Nafisa and Umm Marrahi, it played an important role in testing the main hypothesis, that the Meroitic rulers may have been the builders of these strongholds. Therefore, for the pottery studies, the main objective was to provide chronological data, particularly regarding the date of the erection of the walls. To achieve this goal and deliver reliable results, the studies needed to be based on material from well-defined contexts, stratigraphically connected with the periods of the building activity. Originally, the planned methodology presumed that it would be possible to extract fragments of pottery from the mortar used in the enclosure walls, as has been done on other Nubian fortified sites (see Łopaciuk *et al*. 2014). This material would allow for the establishment of a *terminus post quem*, while the material from the occupation layers inside the forts could set the *terminus ante quem* of the forts' construction.[1]

Unfortunately, none of the three forts delivered enough material to implement this method. At Hosh el-Kab and Abu Nafisa, the condition of the architectural remains on the surface did not allow us to collect pottery samples from the mortar. Little pottery was recorded among the wall debris, suggesting that it might have not been used in the construction of the defences. Detailed observations were possible only along short sections of the walls that were uncovered during the excavations, and no pottery sherds were recorded within the mortar. It needs to be stressed, however, that the state of preservation of the Abu Nafisa fort was extremely poor. In Umm Marrahi, the walls were much better preserved, though the stone debris made inspection difficult. In a few places where the wall structure was accessible, potsherds were not recorded in the mortar. In the short section of wall uncovered during excavations, observation also produced negative results.

As a result, the scope of the work was broadened and the main focus of the pottery research was shifted to the materials recovered from the trenches, especially from the layers contemporary with the foundation of the walls and those earlier, below the architectural remains, where identified. Inside each of the enclosures, excavations were conducted within two areas, and all potsherds were collected separately for each layer.

The study of the pottery was based on the standard procedures for archaeological ceramics (see Orton and Hughes 2013; Rice 2005; Shepard 1976). All potsherds recovered from the excavations were collected and put into context-groups, each representing a stratigraphic unit. After washing, all fragments were divided into general morphological types, then counted and photographed. In the next stage, diagnostic sherds and some selected non-diagnostic fragments were left for further study. The visual examination of the pottery undertaken by examining each piece macroscopically provided data about technology, form and finishing, morphology and ornamentation. Selected fragments that represented main fabric groups were exported to Poland where the analysis of their fresh breaks was supported by observations made under a stereoscopic microscope (Nikon SMZ1000). All documented variables were used for the cross-dating method during the search for parallels.

Questions involving ceramics were connected with the chronological boundaries of the forts' functioning, and with the nature of human activities that took place there in the historic periods. With these issues in mind, it was decided to conduct a small pottery survey on each of the sites. The main tasks of this work included describing the distribution of potsherds on the surface, and recognising chronological periods of the site's occupation, as well as its character and intensity. The survey was conducted inside the forts by line-walking in conjunction with the mapping of the finds. Pottery from each findspot was photo-documented and described

[1] For more information about the methodology of the pottery research, see Chapter 1.

directly on site. Only a small number of fragments was collected for further analyses.

The question regarding the function of discovered pottery vessels also became vital for a better understanding of the forts' use. However, considering the secondary context of the finds and their fragmentary preservation, it was possible only to make some general assumptions, and then only concerning the intended function of the vessels in their most fundamental role as tools (Braun 1983). The overwhelming majority of vessels could be assigned into one of three broad categories: processing, storage and transport of food or liquids (Rice 2005, 208–211). Interpretation of the vessels' use was based on technological attributes (form, paste composition, surface treatment, etc.), which are connected with performing particular tasks (Skibo 2013, 28).

Description of the assemblages

The pottery found during the excavations at the three forts, as well as the assemblages collected from the surface, consisted only of sherds and no complete vessels were found. Some larger pieces or full-profile fragments, which allowed us to reconstruct whole forms,

Figure 4.1. Examples of reused fragments and repaired pottery (photos and drawings by Aneta Cedro)

came only from the surface, and most were modern or connected with the most recent periods during which the site functioned. Although the assemblages from each site contained slightly different materials, which will be described in more detail below, there are some noticeable similarities between them. The vast majority of ceramics from the three sites is represented by undecorated body sherds, predominantly coarse wares (in Abu Nafisa it is 70% of the whole excavated collection, in Hosh el-Kab 78% and the highest percentage found at Umm Marrahi is 81%), which for our chronological estimations has only limited information value. The potsherds recovered from the trial trenches were almost exclusively handmade, and wheel-thrown vessels were recorded only as singular, very small fragments. In Hosh el-Kab, and especially Umm Marrahi, some small but noteworthy groups of wheel-made pottery were recorded among the surface finds.

Some sherds from Hosh el-Kab and Umm Marrahi bear traces of re-use as tools, which manifested in their smoothed edges (**Figure 4.1**: CF-170, 172). A few fragments were cut intentionally into a circular shape; considering their small size they could have served as plugs or stoppers for bottles, or as game tokens (Figure 4.1: CF-6, 173). Also, from the surface of the Hosh el-Kab fort, came a fragment of a rounded sherd with a hole in the middle, which was possibly a spindle whorl (Figure 4.1: CF-171). Regarding other modifications, drilled holes, which may be interpreted as marks of repair (usually two or three in a row), were observed on a few potsherds from each site (Figure 4.1: CF-94, 139). They were noticed on thick-walled fragments of doka and on burnished bowls, both black and red, as well as on body fragments of closed vessels with matt impressions on the surface, these being most probably from globular bottles termed 'beer jars'. Most repairs can be connected with vessels attributed to the Post-Meroitic period.

Umm Marrahi

Research at the Umm Marrahi fort started during the first season of the project in January 2018, when a small pilot-survey concentrating on pottery was conducted there. The main work, however, was carried out in November the same year, during the second field season, and it was the last of the sites studied.

The ceramic assemblage, key for the main objectives of the project, was collected from two trial trenches, Area 1 and Area 3 with their extensions: Area 1A, Area 3A and 3B. Additional material was provided by cleaning the wall-section at Area 2 and wall-top at Areas 4 and 5. Pottery from the surface survey was separately analysed. Overall 1249 potsherds were collected, of which 905 came from the excavations of two trial trenches. This is approximately ten times more fragments than that found at the other two forts, although the scope of excavations within each fort was similar. This relatively rich assemblage made a comparative base for the interpretation and chronological identification of pottery from Hosh el-Kab and Abu Nafisa, where the small number of sherds or the state of their preservation would not have provided conclusive data without reference to the material from Umm Marrahi. This also allowed us to make some chronological correlations between the sites, therefore, it is reasonable that the pottery from this site should be introduced first.

Area 1

The greatest number of potsherds came from the excavation within Area 1–1A, with altogether 532 fragments collected from seven arbitrary layers (see **Table 4.1**). The richest in pottery were the topmost layers (layers 0, 0s, 0w and layer 1), which were of a mixed character. They yielded fragments attributed to different chronological periods, starting with the Mesolithic/Neolithic through Post-Meroitic and ending in modern times. Among the sherds from the oldest period, one fragment had traces of reuse (one of the edges was rounded and smoothed). The coarse quartz inclusions, characteristic for the paste used in this period, made it a well-suited tool for scratching or smoothing. The Post-Meroitic period was mostly recognised in some potsherds with quite distinctive burnished surfaces, mostly of a dark-brown or black colour (**Figure 4.2**). To the Funj period were linked some red-ware fragments of fairly thick-walled bowls or large pots, with a crude surface and incised decoration in the form of cross-hatched bands, zigzag or oblique short lines. A few large fragments of incense burners (Figure 4.15: CF-57, 58) may be the remains of religious rituals, which were conducted inside the fort during the 20th and 21st centuries and whose roots date back to at least the 19th century.

Below the third layer, the groups of recovered pottery became more homogeneous and could be attributed to one chronological horizon. This group was represented mostly by coarse ware vessels (thick-walled jars and bottles) and very distinctive finer products – handmade bowls, thin-walled with a black burnished or polished surface.

	Context[1]	Inv. no	Type of potsherds						Type of pottery					
			All	R	B	H	D	O	Coarse	HM fine black	HM fine red	WM red	Mesolithic/ Neolithic	Other
AREA 1	1-0s	UM-18-95	20	2			2		16	1		2		1
	1-0w	UM-18-96	7	1			1		5	1				1
	1-0	UM-18-99	113	11			4		95	9	1		5	3
	1-1	UM-18-104	42	5			2	2	38		1	2	1	
	1-2	UM-18-129	88	13		1	2		81			1		6
	1-3	UM-18-120	10						8	1	1			
	1A-0	UM-18-133	1	1										1
	1A-1	UM-18-163	103	8			4		92	3	2		1	5
	1A-2	UM-18-166	72	9			1		68	3			1	
	1A-3	UM-18-167	8	3	1				2	5				1
	1A-4	UM-18-183	46	9				1	32	12				2
	1A-5	UM-18-181	20	3				1	14	6				
	1A-6	UM-18-175	2						2					
TOTAL			532	65	1	1	16	4	453	41	5	5	8	20
AREA 3	3-0	UM-18-119	11				1		8	2			1	
	3-1	UM-18-134	2	1					1	1				
	3A-0	UM-18-137	22						18	4				
	3A-1	UM-18-148	13	1					11	1			1	
	3A-3	UM-18-154	7						5	2				
	3B-0	UM-18-164	4						3	1				
		UM-18-173	8						6	2				
	3B-1	UM-18-172	6	1					3	3				
	3B-2	UM-18-176	9	2					8	1				
	3B-3	UM-18-178	15	1				1	11	4				
	3B-4	UM-18-177	18	3					15	3				
	3B-5	UM-18-182	223	22			1	1	184	33	6			
	3B-6	UM-18-180	13	2					8	2	1			2
		UM-18-184	18	2					4	3			11 (1)*	
	3B-6f	UM-18-179	4						4					
TOTAL			373	35			2	2	289	62	7		13	2
TOTAL for AREAS 1, 3			**905**	**100**	**1**	**1**	**18**	**6**	**742**	**103**	**12**	**5**	**21**	**22**

(R – rim, B – base, H – handle, D – fragment with decoration, O – other diagnostic feature; HM – handmade; WM – wheel-made)

* all fragments belong to one vessel

Table. 4.1. Pottery count from Umm Marrahi

[1] Abbreviations are used in the tables to describe archaeological contexts whereby the first number in the abbreviation refers to the Area and the second represents the layer, *e.g.* Context 1A-5 denotes layer 5 in Area 1A.

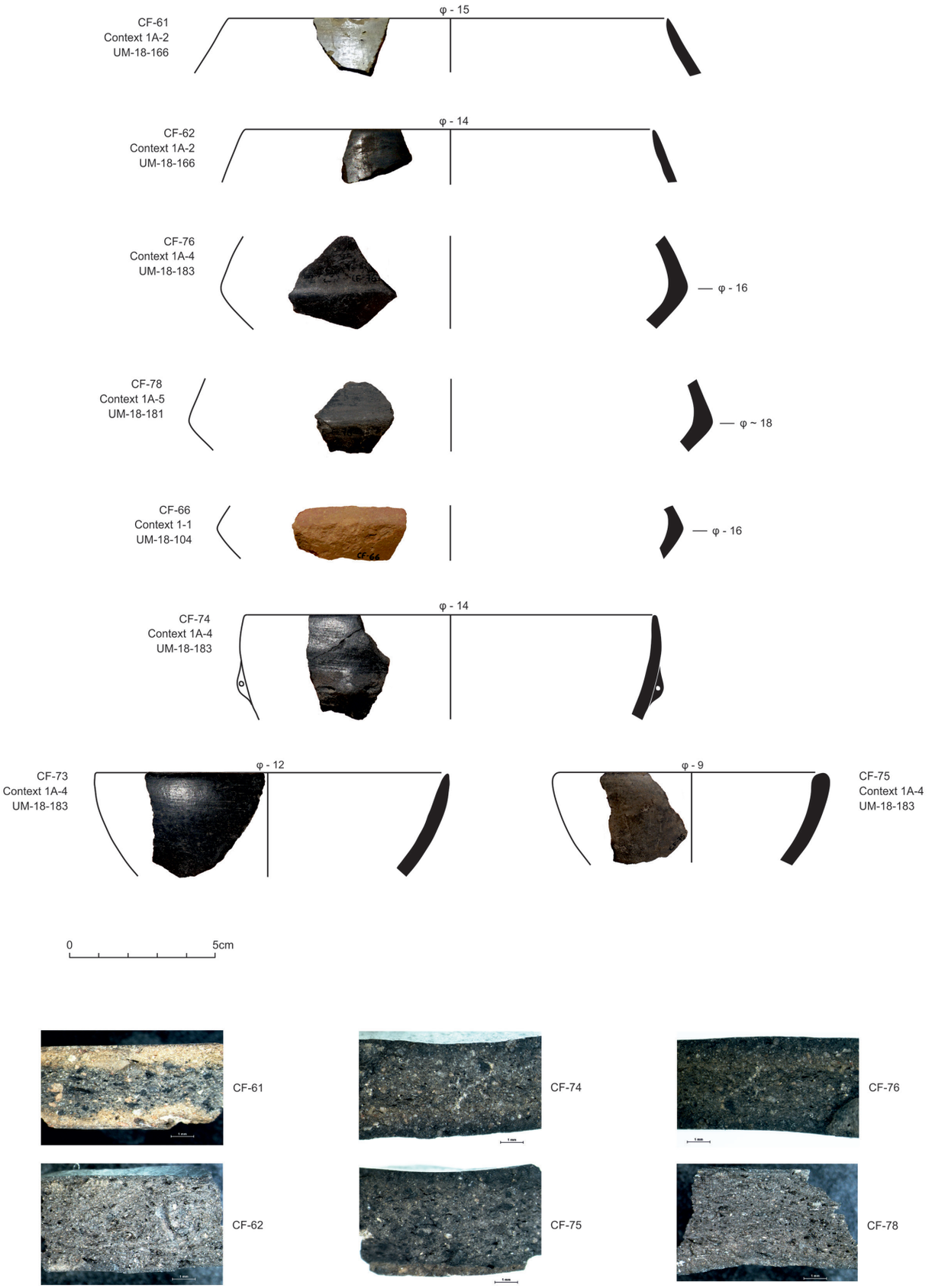

Figure 4.2. Post-Meroitic bowls from Area 1 at Umm Marrahi
(photos and drawings by Aneta Cedro)

Area 3

From the excavation of Area 3–3A–3B, 384 fragments of pottery were collected, and contrary to Area 1 most sherds came from the lowest stratigraphic units (see Table 4.1). The upper strata yielded very little material, a few or a dozen sherds from each context, with a predominance of coarse ware body fragments. The richest in pottery (223 fragments) was layer 5 in Area 3B, which was sealed beneath a thick layer of rubble. With the finds from the deposits below, it created a relatively homogenous assemblage in which residual sherds of much earlier times (Mesolithic/Neolithic) were very scarce and easy to identify. This material provided enough data to enable a more complex study of ceramics from the period corresponding with the earliest occupation of the fort. This pottery corresponds to the finds from the lowermost strata (below layer 3) in Area 1–1A and can be correlated with the Post-Meroitic/transitional Christian ceramic traditions.

As mentioned above, all the pottery from this homogenous material from both Areas 1–1B and 3–3A–3B, was handmade with a clear division into two groups: coarse ware, with a crude surface and relatively thick walls; and finer products elaborately finished, usually slipped and burnished or polished. The fragmentary nature of the records does not allow us to make any complete characterisations of the forms or to put them in a systematic typological order. Diagnostic fragments never exceeded 20% of the finds from the trenches. Nevertheless, based mostly on the rim-fragments, some general groups of vessels can be distinguished.

The finer pottery almost exclusively consisted of bowls and dishes with a well-executed smooth surface, in sizes that varied from small to medium (Figures 4.3–4.4). The fabric was based on Nile alluvium, well-sorted, with a fine organic admixture added to the clay. Almost all fragments of bowls are blackware and were fired in a reduced atmosphere, though redware variants are also present (Figure 4.3: CF-103). The closest parallels to these products can be sought among the pottery from the tumuli graves located at the foot of the Jebel Umm Marrahi, which were dated by their excavator to 'the late Post-Meroitic/early medieval period' (El-Hassan 2006, 31). However, the fragments from the trenches inside the fort represent more diverse forms, and are often of better quality than the vessels from the graves.

The most distinctive was a group of small bowls with diameters ranging from 100–180mm, but mainly between 140–150mm, some with very thin walls (**Figure 4.3**). They present a few variants of semi-spherical shape with both restricted and unrestricted orifices. Perhaps their most striking feature is their black surface, slipped and burnished or polished. In the case of a few fragments, the potters must have taken great care in smoothing these vessels, both inside and out, to produce a very high, almost lustrous gloss. On a few potsherds some incised decoration was recorded in the form of the grooves below the rim or parallel, vertical lines (Figure 4.3: CF-107); some bowls with thicker walls had oblique lines or zigzag patterns cut on to the flattened rim. A few fragments had plastic decoration, small lugs on the rim or very distinctive bosses pierced horizontally for suspension (Figure 4.2: CF-74) in a type well known from Soba (Welsby 1998, pl. 55, 34–37), but also from a few cemetery sites on the Blue Nile like Um Sunut (Balfour Paul 1952, pl. 4), Qos Nazra or Karim's Garden near Sennar (Edwards 1991, pl. I and IX). A separate variant of thin-walled bowls included distinctive vessels with sharply carinated walls (Figure 4.2: CF-76, 78; Figure 4.3: CF-110). These bowls were also present in a redware variant, and a few small fragments identified as this form were covered with a cherry-coloured slip (Figure 4.2: CF-66; Figure 4.3: CF-103). This group of carinated bowls is closely paralleled by a number of vessels, both in a red and black variant, collected from the lower strata in an early domestic context at Soba (Welsby 1991, 194, fig. 104; Welsby 1998, 112, pl. 46) or from the Post-Meroitic graves at Gabati (Smith 1998, 188, fig. 6.27), which were dated to the late 5th–6th or even the second half of the 7th century AD (Edwards 1998, 206).

The group of medium-sized bowls or dishes consisted of a few variants of blackware with polished or burnished exteriors and interiors (**Figure 4.4**). Their colour may vary from black to greyish or light-brown and the finish of the surface is often not as meticulous as on the smaller bowls. Rim diameters range from 200 to approximately 300mm. Among them is a well-represented group of bowls with distinctive flat or chamfered rims and strongly outward-sloping sides (Figure 4.4: CF-96-98). They were well-executed with carefully burnished or smooth polished surfaces. No decoration was noticed for this group of bowls except one fragment with two oblique bosses on the rim (Figure 4.4: CF-96). This type of bowls is closely paralleled by examples from Soba (Shinnie 1961, fig. 10.IIb; Welsby 1998, 112) and also from cemeteries on the Blue Nile, Qos Nazra, Umm Sunut and Karim's Garden near Sennar

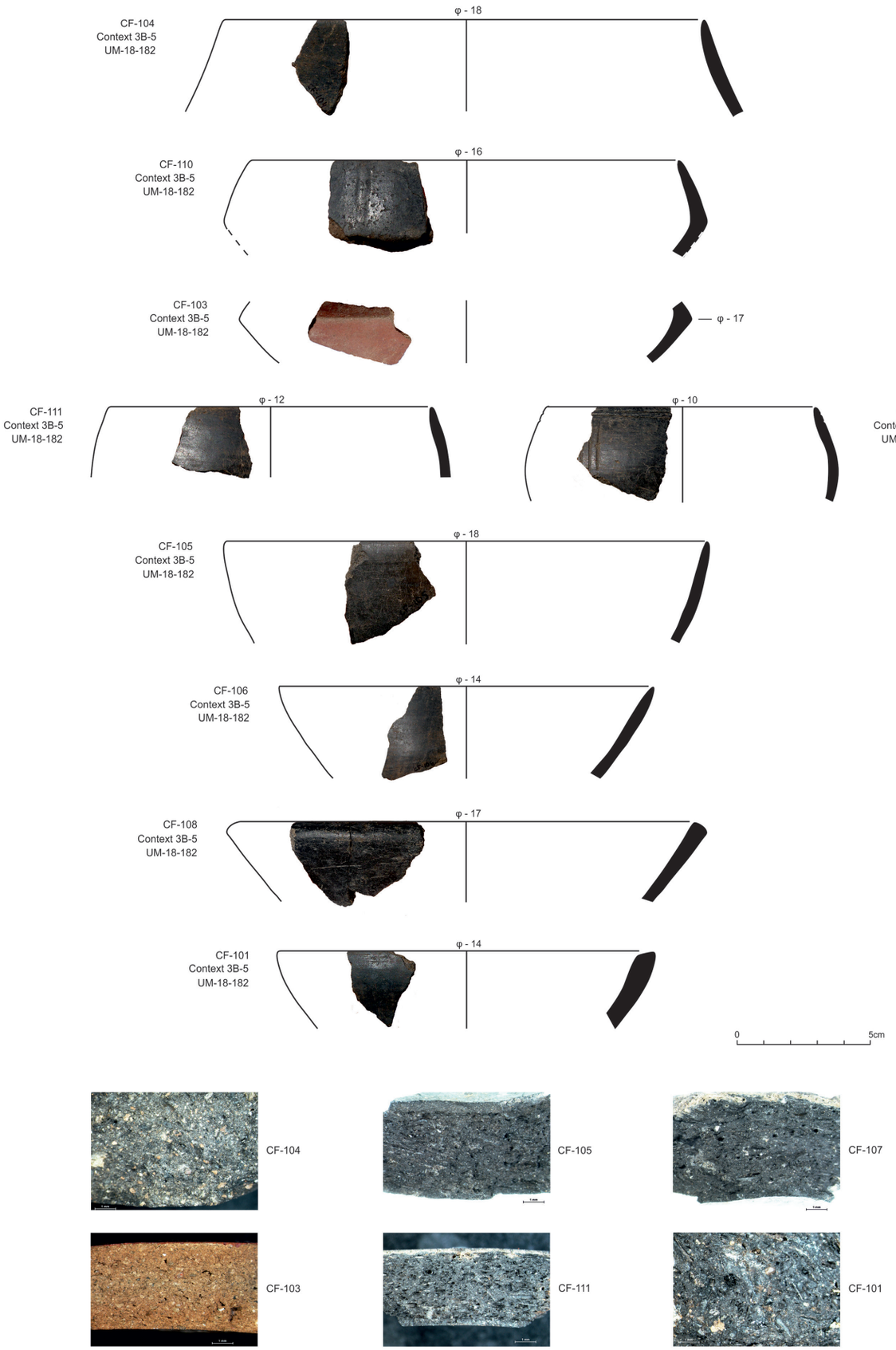

Figure 4.3. Post-Meroitic bowls from Area 3 at Umm Marrahi
(photos and drawings by Aneta Cedro)

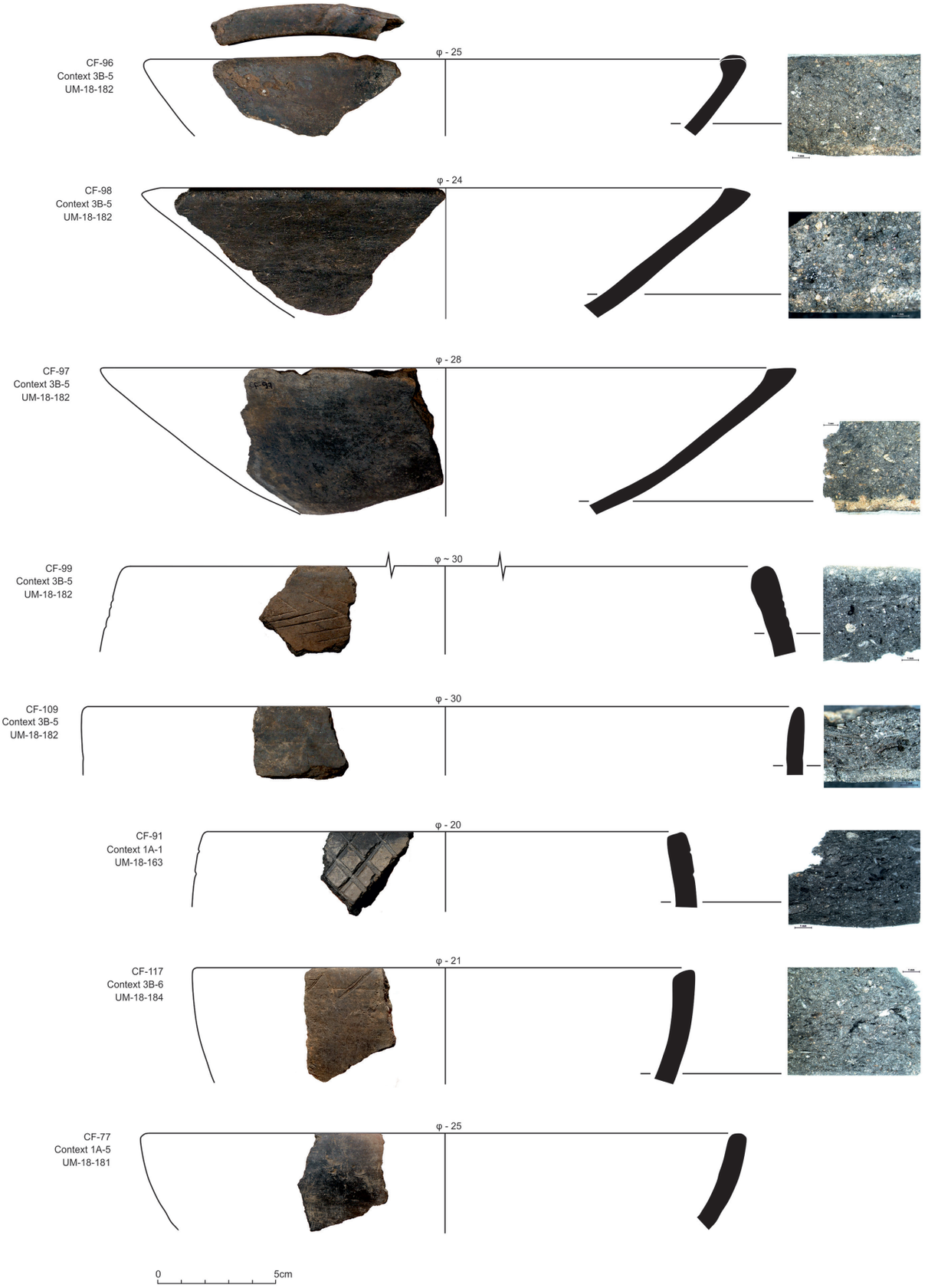

Figure 4.4. Middle-sized bowls from Area 3 at Umm Marrahi (photos and drawings by Aneta Cedro)

(Edwards 1991, pl. II and IX). Similar bowls were also found at Wad al-Haddad, a few with incised Christian graffiti (Balfour Paul 1952, 212–213). Some incised decoration was recorded on another group of medium-size bowls with more vertical walls. Bands of zigzag or cross-hatching were usually executed below the rim on the outer surface (Figure 4.4: CF-91, 99, 117).

Considering the medium size of the fine hand-made bowls, and the treatment of their surfaces, which resulted in smooth and nonporous walls, one can assume that their function was connected with serving food, while small bowls could have been used for individual consumption or drinking.

The second group within the pottery assemblage from the trenches constituted the coarse ware fragments that made up the overwhelming majority of the potsherds (more than 80% based on a count from both areas). The possible function of the coarse ware pottery was more versatile than that of the finer vessels, and in consequence, the possible types and forms were also more diverse. Unfortunately, the fragmentary state of the finds and lack of diagnostic fragments hindered the study of these ceramics.

Quite recognisable among the coarse potsherds were fragments of bowls, and among them several different forms could be distinguished (**Figure 4.5**). Most were of a medium or large size (rim diameter from 300 to over 500mm); however, some smaller examples were also present. A common feature of the bowls was a rather crude outer surface without any slip and a smoothed interior, with some fragments even burnished. The colour of the unslipped exterior was usually brown, while the inner surface was often of a greyish hue. On the external surface traces of soot were often recorded. Quite distinctive was a group of relatively shallow open bowls, with vertical or sloping walls, often thicker in the upper part, and with a characteristic decoration of small depressions or diagonal cuts along the top of the rim (Figure 4.5: CF-81, 114). Similar bowls with such embellishment are known from Soba (Welsby 1998, 92, pl. 41), while the design of the rim decoration itself, associated with a different type of bowls and other vessels, was recognised on many Post-Meroitic sites in the Blue Nile (Edwards 1991, pl. II, IV and X; Abd el-Rahman 2006, fig. 4.6) and Shendi regions (see Smith 1998, fig. 6.28–6.29).

In the case of some rim fragments (Figure 4.5: CF-68), it was difficult to determine whether they should be interpreted as bowls or doka. The latter type was identified in several potsherds, belonging to one vessel for which there is no doubt as to its function (Figure 4.5: CF-56), but the context of their discovery (layer 2 in Area 1A) does not allow us to define their chronological attribution unreservedly. The fabric of this doka was rather coarse. In a break with a Hackly fracture, abundant medium and coarse sand grains were visible, as well as frequent voids from burnt-out vegetable temper. The surface treatment involved burnishing on the interior, while the exterior was left rough. The colour inside and out was a light-brown hue, however, both surfaces were partly covered with black soot. The walls and flat base were very thick (15–20mm) and rim diameter was approximately 600mm.

Other utility vessels that were present within the assemblage from the lowest layers, included mostly non-diagnostic body fragments characterised by thick walls and rough inner and outer surfaces, that can be interpreted as large storage containers (**Figure 4.6**). The very few rim fragments evince that they included neckless, plain jars (Figure 4.6: CF-67, 112) as well as bottle-like vessels with short, wide-mouthed necks (Figure 4.6: CF-52). The numerous thin-walled body fragments, often with mat impressions on the outer surface or traces of red slip, may be linked with the so-called ‘beer jars’, very distinctive globular jars with slender necks that are known mostly from Post-Meroitic graves. A fragment of narrow neck covered with a burnished red slip (Figure 4.6: CF-71) and a small red burnished rim fragment (Figure 4.6: CF-60) also represent this type of vessel.

The clay figurine

Among the ceramic assemblage recovered from layer 3 in Area 1A a unique object was identified, a small animal figurine (**Figure 4.7**). Though it belongs to a different ‘realm’ than the rest of the pottery, it will be discussed here as a product made of clay. The figurine is small (height 44mm, length 35mm, width 27mm) and incomplete – the head, lower part of three legs and back are not preserved. The figurine was made of Nile silt mixed with organic temper, modelled by hand and baked. The surface is crude without any additional treatment. As the head of the figurine is missing it is impossible to identify the species, but the general shape suggests that it represents a bovine.

Clay animal figurines appear sparsely on archaeological sites in Sudan, dating back from the Neolithic (Haaland and Haaland 2017, 95) through C-Group and Kerma (see Eisa 2004, 186, pl. 2) until post-medieval

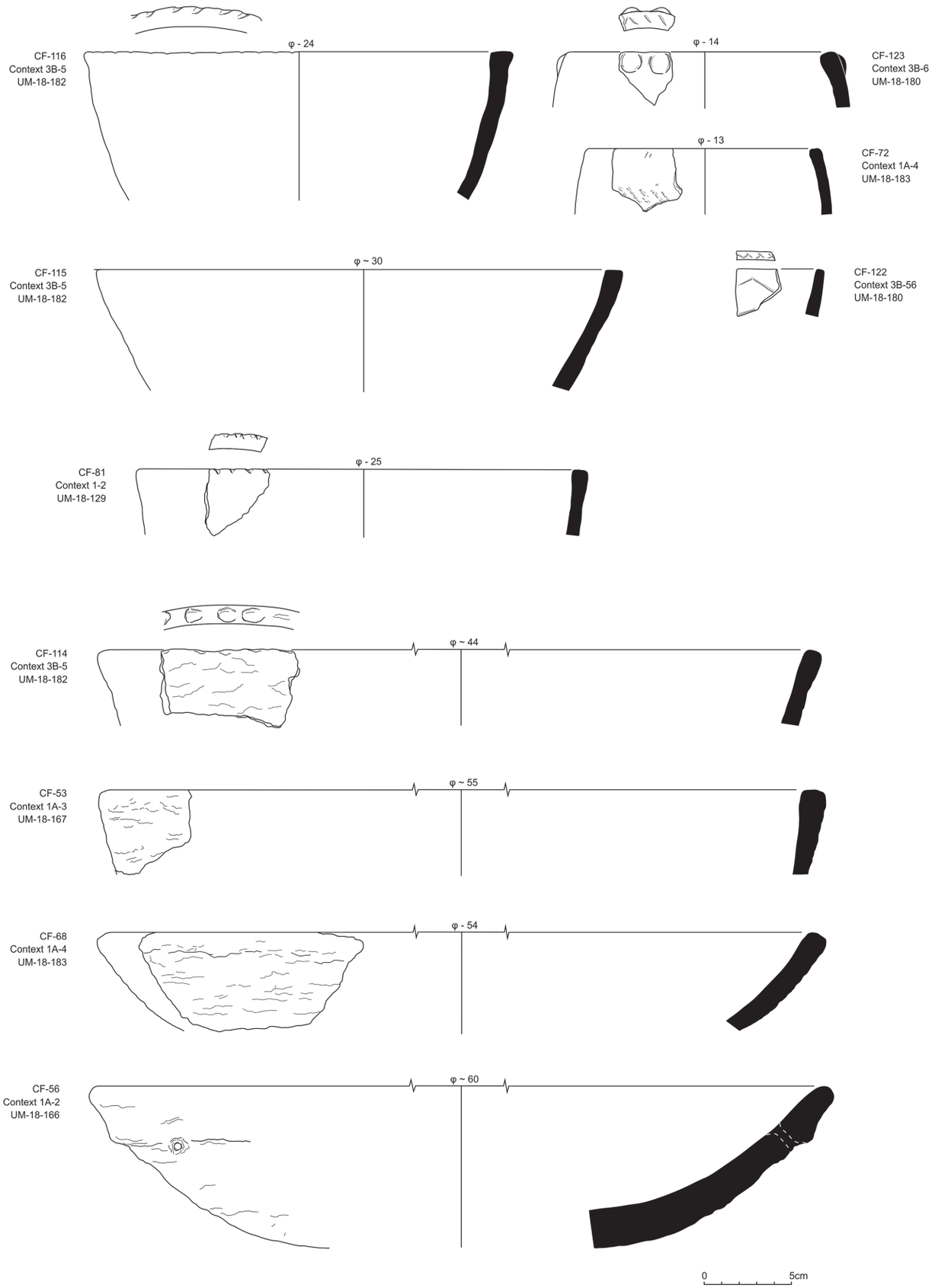

Figure 4.5. Coarse ware bowls and doka from Umm Marrahi
(drawings by Aneta Cedro)

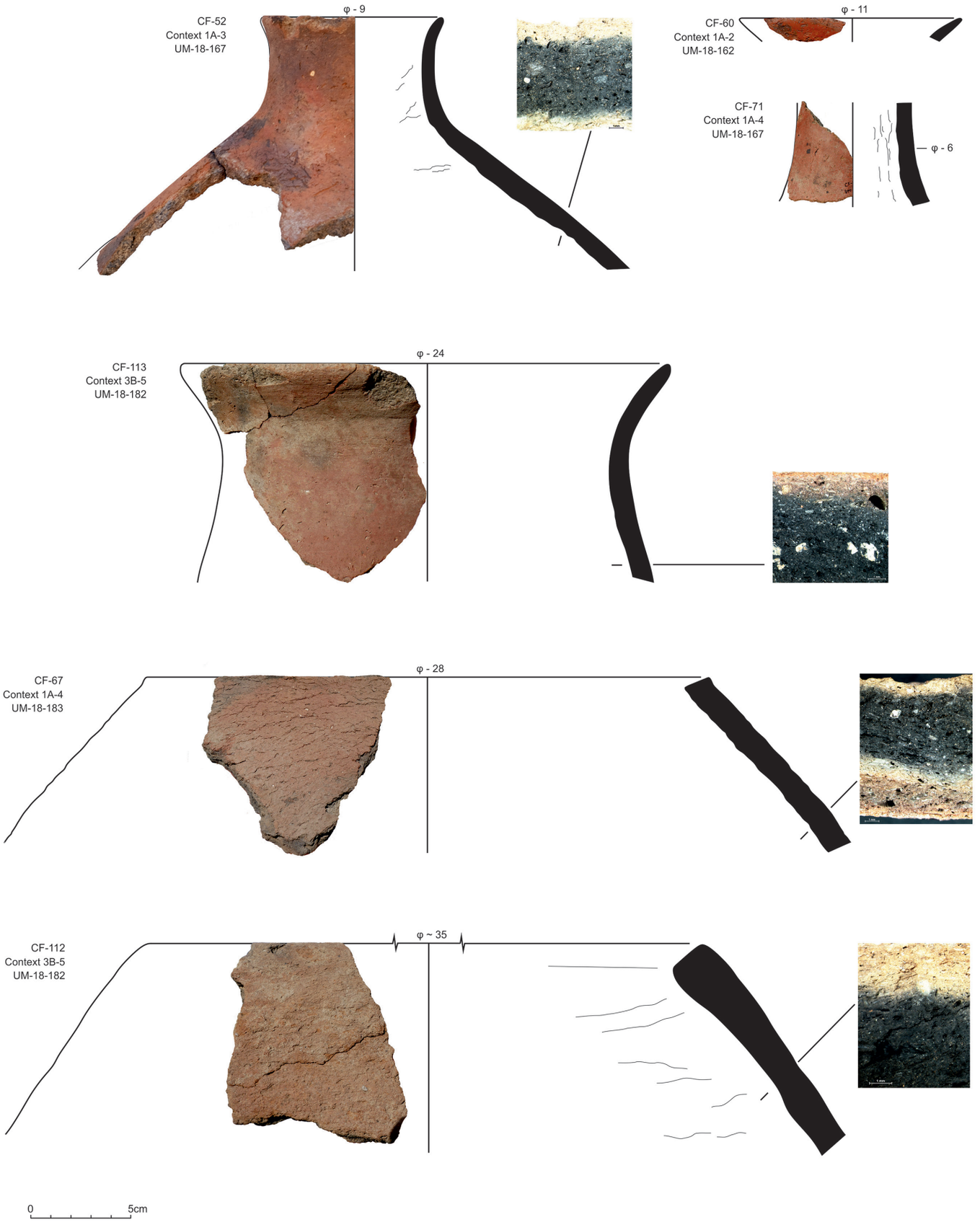

Figure 4.6. Post-Meroitic storage containers from Umm Marrahi (photos and drawings by Aneta Cedro)

Figure 4.7. Animal clay figurine from Area 3 at Umm Marrahi (photos by Aneta Cedro)

times. One of the biggest collections of such finds is known from Jebel Moya where nearly 1500 animal figurines were recorded (Addison 1949, 146–149), and which according to new dates after re-analysis of the material (Brass and Schwenniger 2013), have been attributed to the Meroitic period. Of similar date (from the 2nd to the 4th century AD) are also recent finds from Muweis (David 2018), while sets of figurines from Abu Geili (Crawford and Addison 1951, 88) and Dar el-Mek (Addison 1951, 176) may be of a later date, from the Post-Meroitic to Funj period. The attempt to date the figurine from Umm Marrahi through analogies seems futile since objects of this kind were rather individual creations of a craftsman-artist devoid of stylistic features that could be linked with a specific period. However, considering technological aspects such as paste composition and firing, the object fits well into the Post-Meroitic/transitional Christian period, like the rest of the pottery from the same stratigraphic context.

Pottery survey

The surface survey of pottery was intended as a supplementary activity at the start of the project. While at Hosh el-Kab and Abu Nafisa it retained a supporting role, at Umm Marrahi, in the course of the work the survey developed into an independent sub-task, with some separate objectives. Although it went beyond the original plan it remained, nonetheless, linked to the main aims of the project. This change was dictated by the more complex history of the site, which was manifest through the abundance of potsherds from different periods scattered across the whole plateau. The new goal that was set for this surface research, which territorially extended beyond the boundaries of the fort itself, was to recognise and describe the broader archaeological and cultural context in which the stronghold was constructed and used.

The tasks of the surface survey included: describing the distribution of the surface pottery over the Umm Marrahi plateau; placing this material in a rough chronological framework; determining for each recognised period the highest density of corresponding archaeological surface material; and finally characterising the site occupation and estimating its intensity within the established chronological boundaries.

The small pilot-survey was conducted on the hill during the first season of fieldwork. It focused mostly on the fort's walls but allowed us to obtain general information about the surroundings as well. During the second season, the regular survey covered the whole plateau of Umm Marrahi, including areas within two enclosures (main fort = site 2; southern enclosure = site 1) and the space between them. Inside the fort and along the walls, 23 findspots were registered and another 33 were documented across the rest of the plateau. Finds from each marked location were photo-documented directly at the site, and from most, some representative pottery samples were selected. Altogether 368 fragments were collected from the surface. Artefacts were scattered over the entire area of the flat hill-top, disappearing on the stone-covered slopes. The highest density of finds was recorded on the eastern part of the plateau and in the area between the fort and the northern part of site 1. The overwhelming majority of the surface pottery was comprised of handmade wares, and only 41 fragments of wheel-made vessels were recorded in the entire surveyed area.

All of the potsherds can be attributed to one of four chronological groups. The oldest pottery, which paradoxically dominates among the surface finds, fits in the early to middle Holocene, the so-called Mesolithic/Neolithic period (**Figure 4.8**). The remains of a prehistoric settlement were identified here by scholars who conducted research at the site in the 1980s (Elamin and

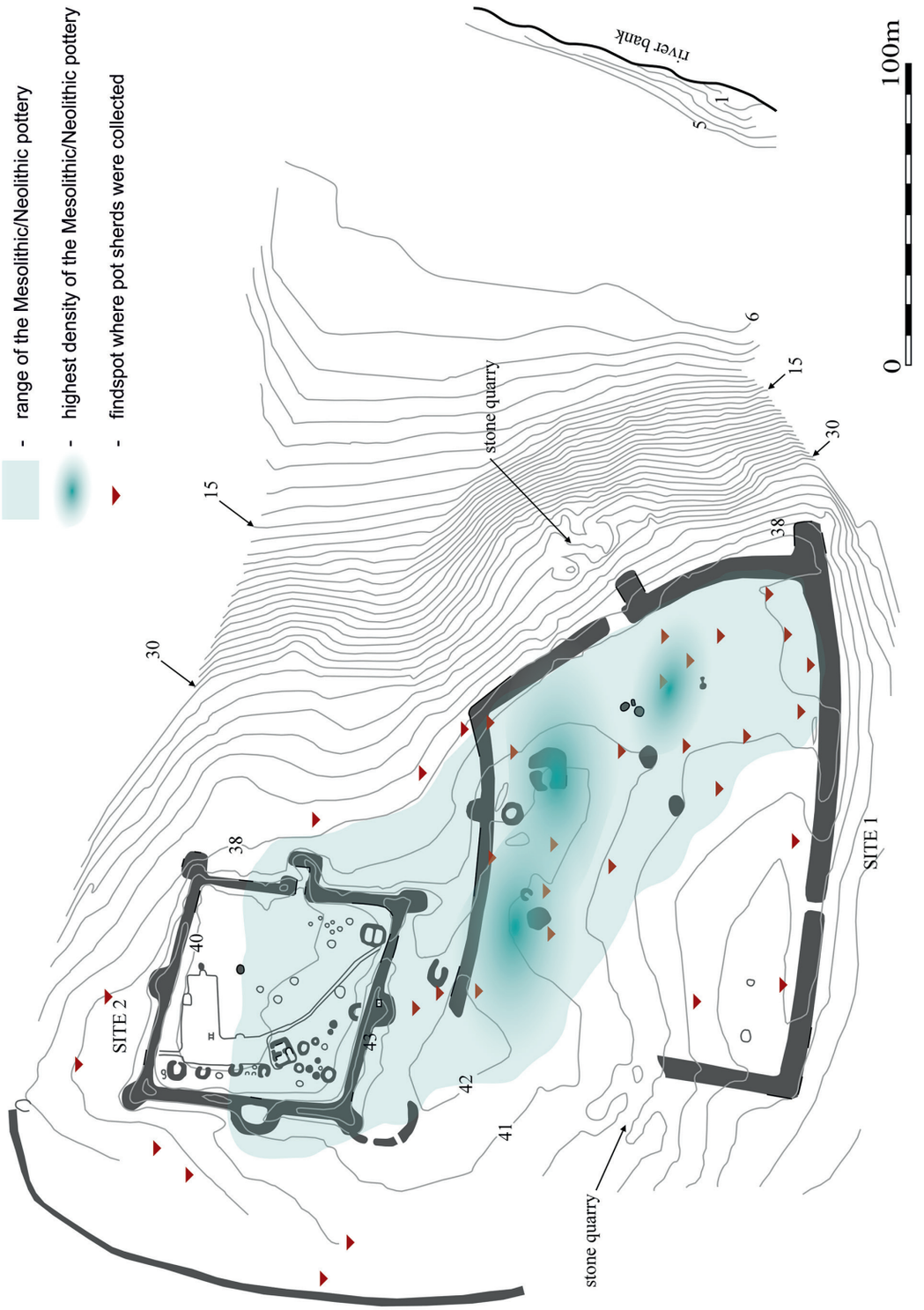

Figure 4.8. Distribution of the Mesolithic/Neolithic pottery on the plateau of Umm Marrahi (plan by Adrian Chlebowski and Mariusz Drzewiecki, prepared by Aneta Cedro)

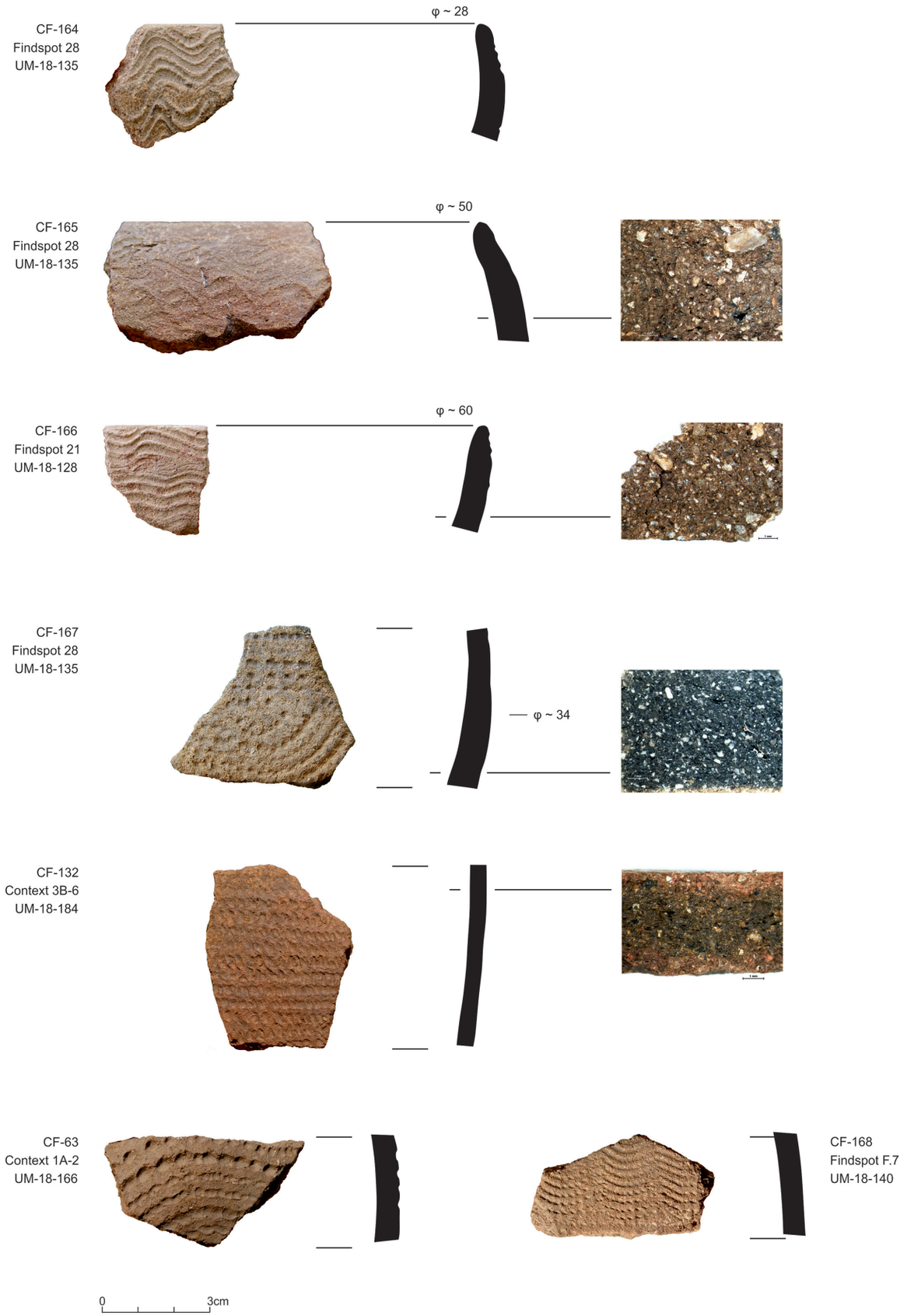

Figure 4.9. Examples of the Mesolithic/Neolithic pottery from the Umm Marrahi plateau (photos and drawings by Aneta Cedro)

Mohammed Ali 2004; Gautier *et al*. 2002, 337) and both the site and the pottery have often been referred to and discussed in many publications concerning the prehistory of the region. A distinctive feature of this pottery is the fabric, which in most cases was tempered by angular quartz grains of medium-to-large or fine-to-medium size, occurring in abundant quantity, and usually visible not only in the break, but also on both surfaces (**Figure 4.9**). Most of the potsherds in these fabrics were decorated, with the most common patterns including: incised wavy lines, dotted wavy lines, rocker stamp dots or combed bands. Singular finds of this prehistoric pottery were recorded on the whole plateau; however, their highest density was concentrated on the most elevated areas, in the northern and eastern part of the large enclosure (site 1). Their number significantly decreased in the north part of the site.

Another group of potsherds, easily discerned among the surface finds, was attributed to the Post-Meroitic period (**Figure 4.10**). This pottery corresponds well with the material from the lowest layers in Areas 1–1A and 3–3A–3B and clearly similar types of vessels were recorded. The most characteristic and easy to recognise were finer products, particularly black burnished or red burnished bowls of different sizes (**Figure 4.11**). Furthermore, red burnished neck fragments of 'beer jars' could be attributed with certainty to the Post-Meroitic or Post-Meroitic/transitional period. A large fragment of the upper part of such a vessel (Figure 4.11: lower left) was even used in the construction of the north wall in the southern enclosure (site 1). Apart from the forms known from the assemblage in the trenches, a fragment of an incense burner or offering stand with a burnished red-slipped surface (Figure 4.11: CF-163) represented a new type. The fragment from Umm Marrahi was too small to reconstruct the complete form but possible parallels can be found among the finds from the Post-Meroitic graves in Shaqalu in the Shendi region (Geus

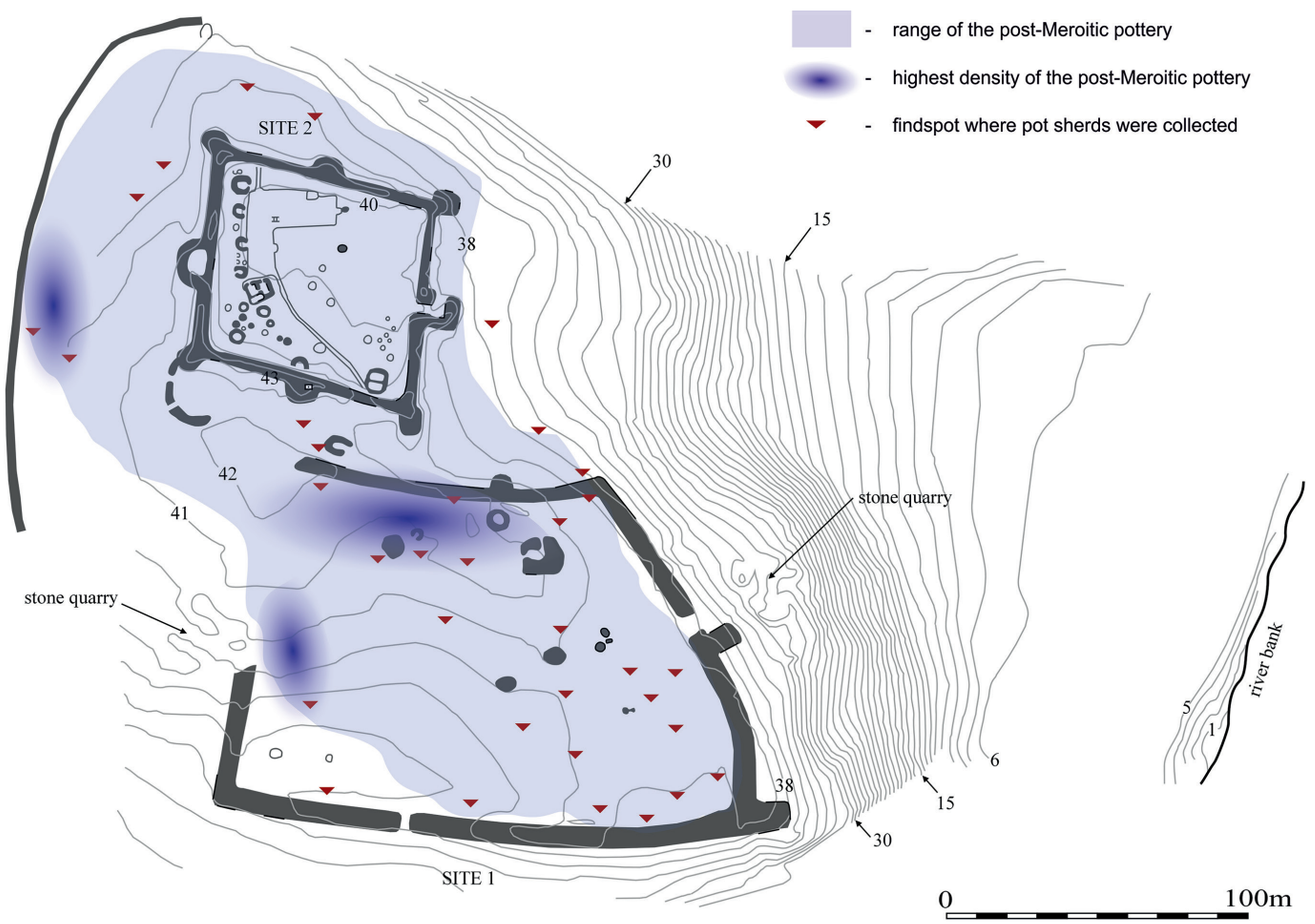

Figure 4.10. Distribution of the Post-Meroitic pottery on the plateau of Umm Marrahi (plan by Adrian Chlebowski and Mariusz Drzewiecki, prepared by Aneta Cedro)

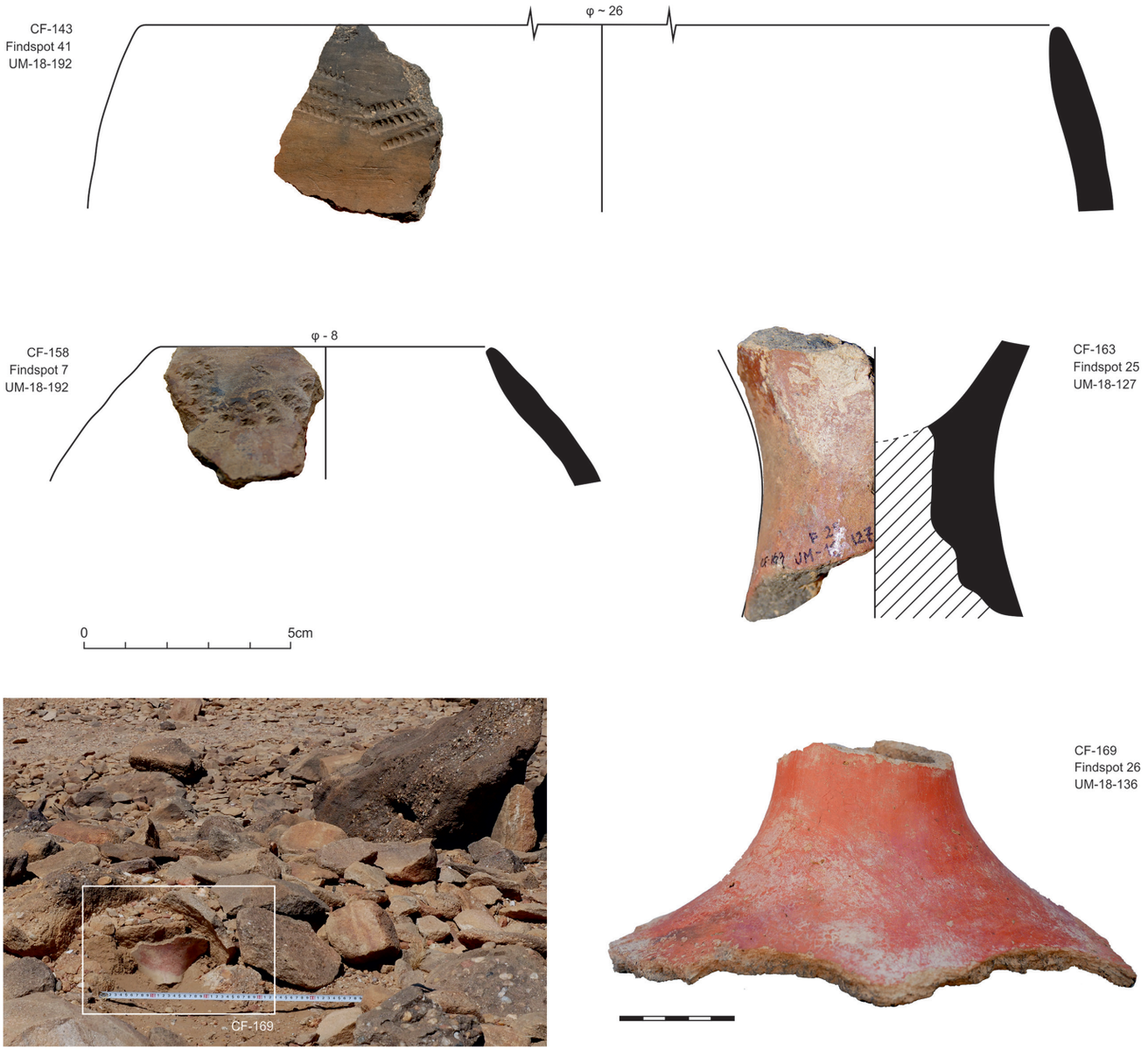

Figure 4.11. Examples of the Post-Meroitic pottery from the surface of the Umm Marrahi plateau (photos and drawings by Aneta Cedro)

et al. 1986, 81, fig. 1) or of a slightly different variant in the cemetery in Gabati (Smith 1998, fig. 6.28). Findspots with pottery from this period were located mostly along the north wall of site 1 and in the western part of this enclosure (Figure 4.10). Some noticeable concentrations were also spotted in the areas west and north of the fort.

The third chronological group recognised among the finds from the surface was linked with the Early Christian or possibly transitional/Early Christian period (**Figure 4.12**). All wheel-made pottery was attributed to this group and included mostly potsherds of red-slipped tableware (**Figure 4.13**) and a few coarse ware body fragments, probably of storage vessels or qadus. The tableware was represented by bowls of typical globular form with rounded bottoms and fragments of bowls or plates with modelled rims, which were derived from the Mediterranean late Roman pottery traditions (Figure 4.13: CF-144). While the vessels of the second group are devoid of any decoration, the fragments of the globular bowls mostly were decorated with painted motifs, including black stripes along the rim, rectangular zones with light-cream background, and black highlighting. One unique fragment had a black interior and

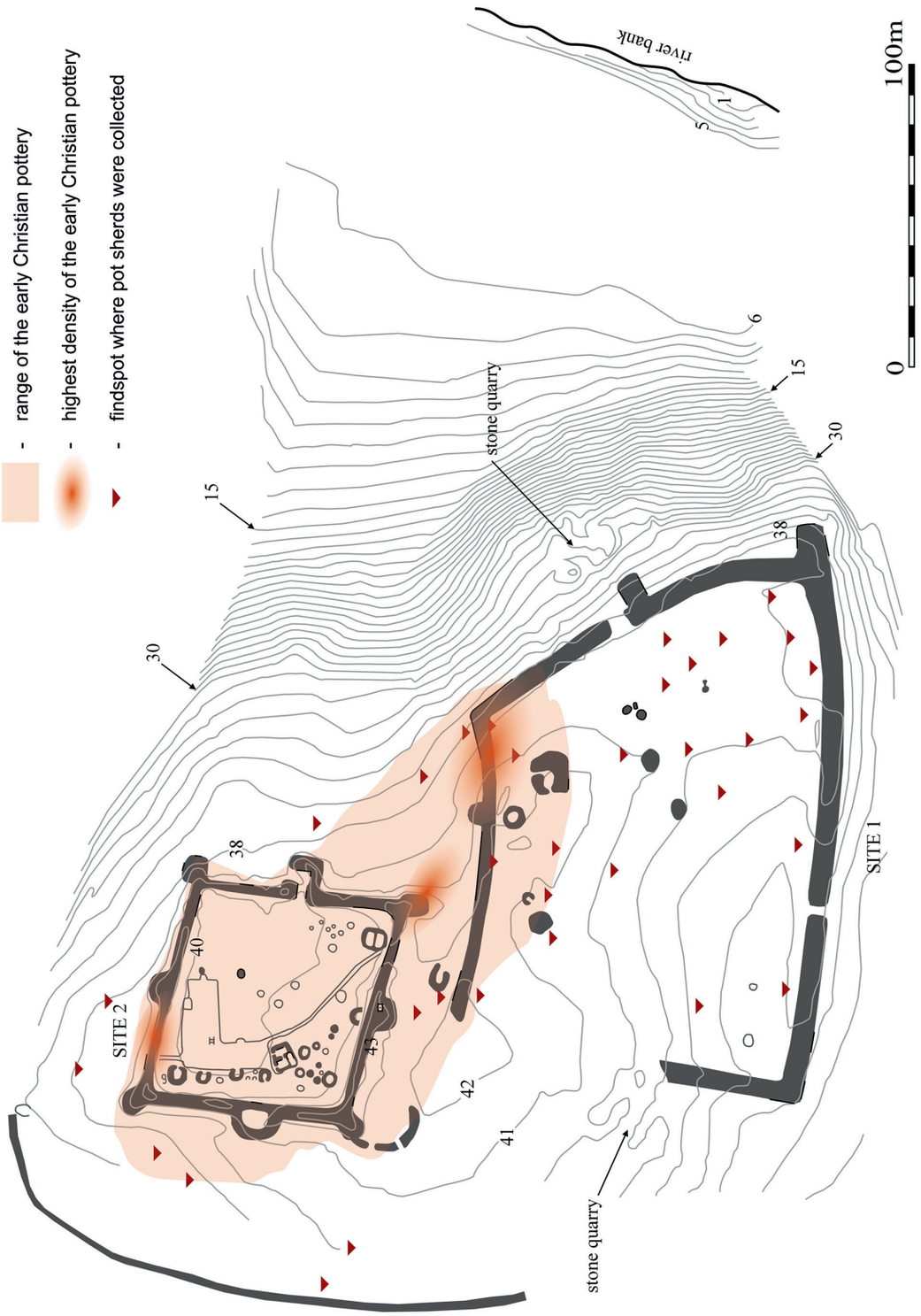

Figure 4.12. Distribution of the Early Christian pottery on the plateau of Umm Marrahi (plan by Adrian Chlebowski and Mariusz Drzewiecki, prepared by Aneta Cedro)

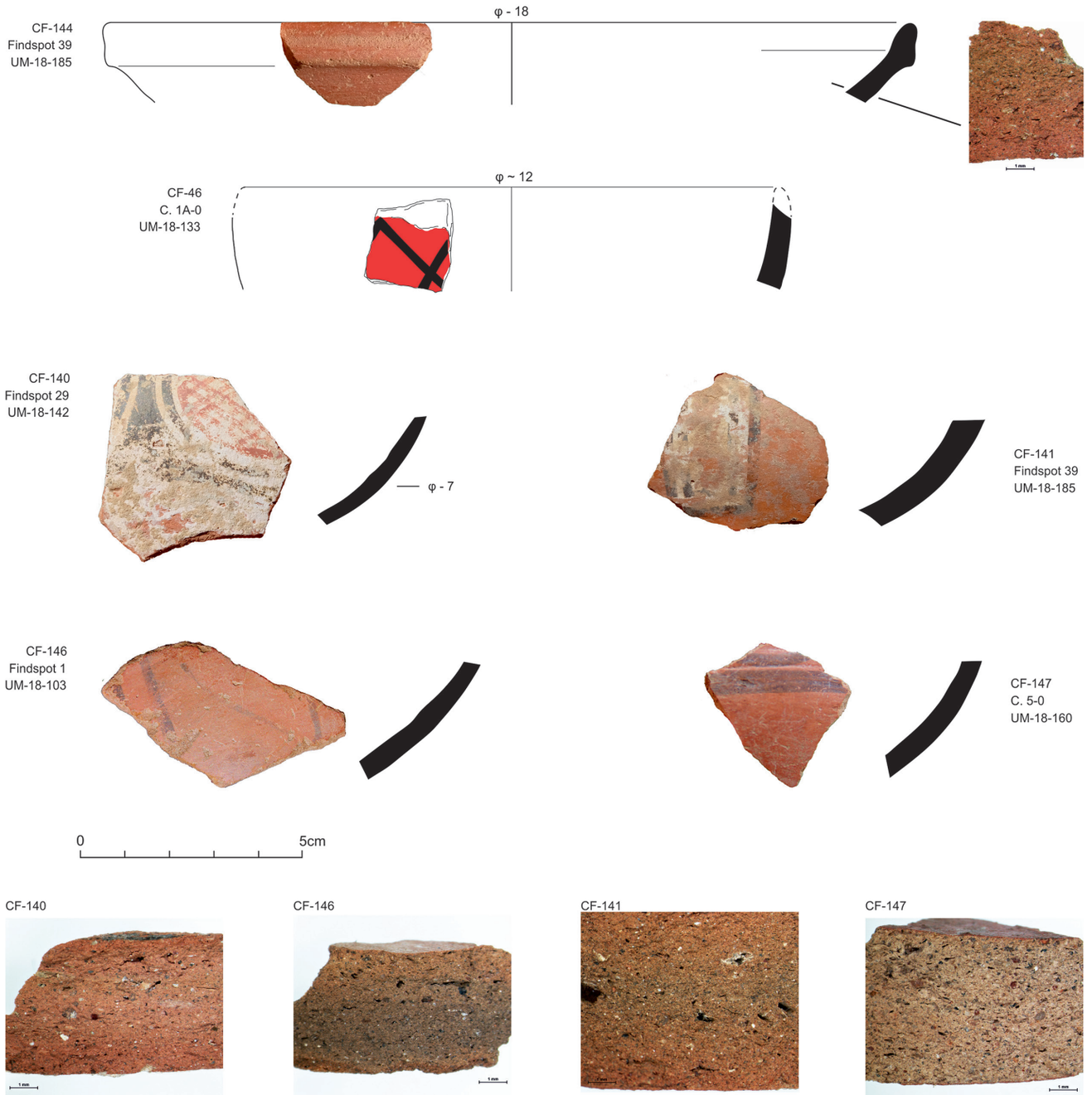

Figure 4.13. Examples of the Early Christian pottery from Umm Marrahi (photos and drawings by Aneta Cedro)

the exterior white surface was painted with black lines and red circles with cross-hatching (Figure 4.13: CF-140). Analogies for this type of decoration and use of colours can be traced among the products of the Soba workshops (Welsby 1998, 119, 170). Red-slipped spherical bowls are a distinctive form of the transitional/Early Christian period, widespread in the Middle Nile valley. They are well attested in the pottery kilns in Old Dongola (Pluskota 2001, 361–363, fig. 6) and also on sites in the Fourth Cataract region (Pluskota 2005, 125–126). The potsherds that can be attributed to the Early Christian period were rather scarce and were found almost exclusively in the area between the south-east corner bastion of the fort and north-east corner of site 1, as well as on the fort wall-top (Figure 4.12).

The last group to be singled out consisted of potsherds from the most recent periods of the site occupation. Since Funj and modern products, out of stratigraphic

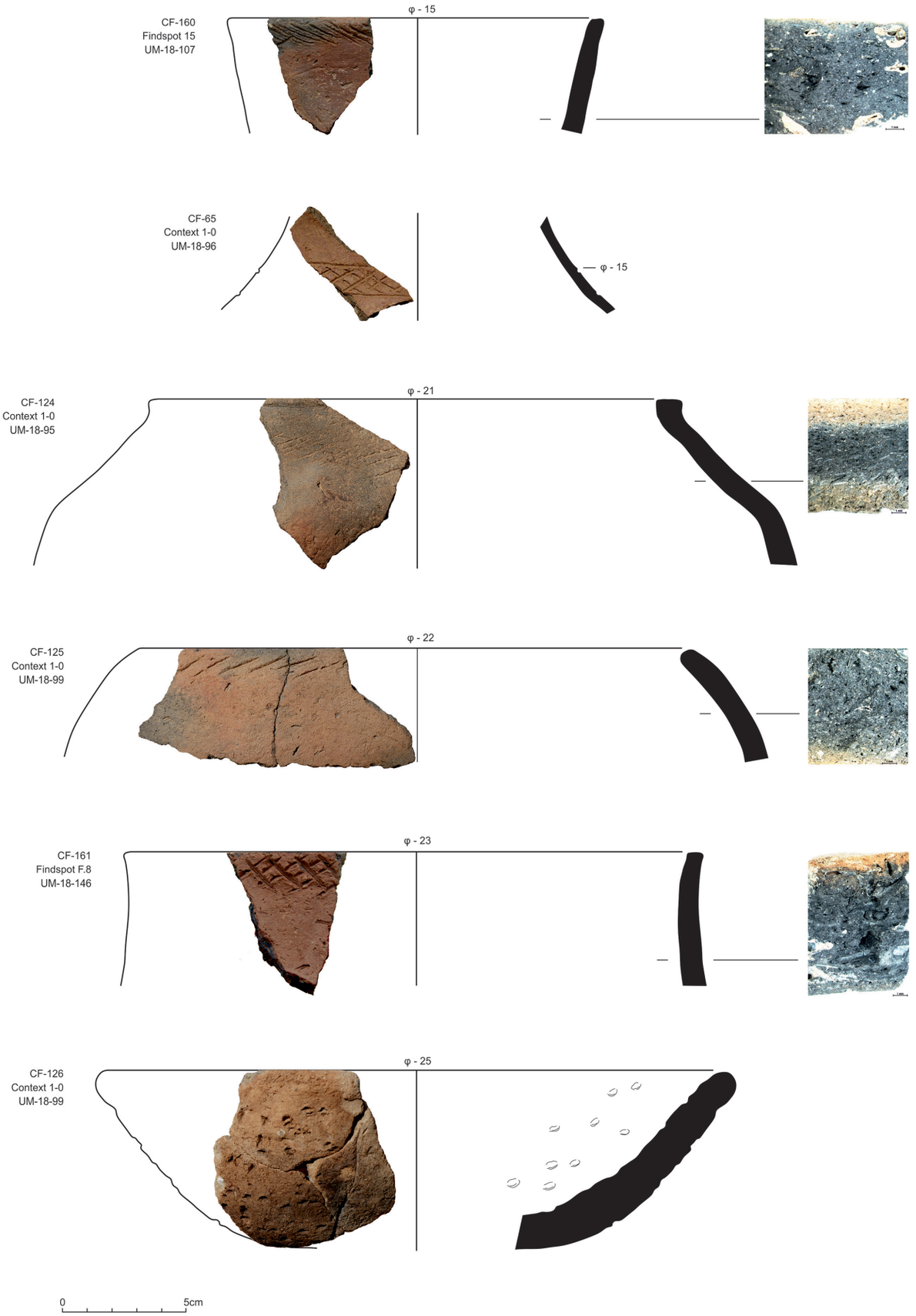

Figure 4.14. Examples of pottery from the Funj period from Umm Marrahi (photos and drawings by Aneta Cedro)

context, were sometimes difficult to separate, they were registered in the description of findspots under one group. Where possible, however, a more accurate attribution was given. The finds that can be attributed to the Funj with high certainty are fragments of incense burners or braziers with finger-size holes in the base and a very distinctive style of incised decoration in the form of hatched bands (Figure 4.15: CF-162). These objects have close parallels among the Funj material identified by Crawford and Addison at Abu Geili (1951, pls. XXXII, XXXIII) and Dar el Mek (Addison 1951, pl. LXXXIIIb), as well as in Soba (Welsby 1991, fig. 121) and further north in the Abkur fortress (Phillips 2003, pl. 114 f-g). To the Funj period can also most likely be dated fragments with similar incised decoration of criss-cross or parallel lines arranged in bands (**Figure 4.14**: CF-65, 161). Such patterns were recorded on fragments of some storage vessels, jars and bottles.

The Funj/modern potsherds were quite evenly distributed over the whole plateau, though a higher concentration was noted outside the east wall of the fort and in the northern part of the enclosure – site 1. Pottery of evidently modern origin mostly was recorded inside the fort and in its direct vicinity. Most vessels of recent date can be connected to the contemporaneous religious function of the hill. Incense burners (**Figure 4.15**: CF-56, 57), bag-shaped water jugs with a burnished surface (Figure 4.15: CF-85), and *azyar* (sing. *zir* – large pots for cooling water) are the remains of the religious practices that are still being conducted inside the fort.

Hosh el-Kab

Hosh el-Kab was the first site researched within the scope of the project. The main focus of the pottery research was directed at the material from well-defined contexts. However, excavation of two trenches delivered only a very small amount of ceramics. The surface survey enlarged the corpus of the research data, but the amount of recovered materials remained relatively low.

From the excavations in Area 2, only 26 sherds were collected and a similar amount, 31 fragments, came from Area 3, while the cleaning of the section of the wall

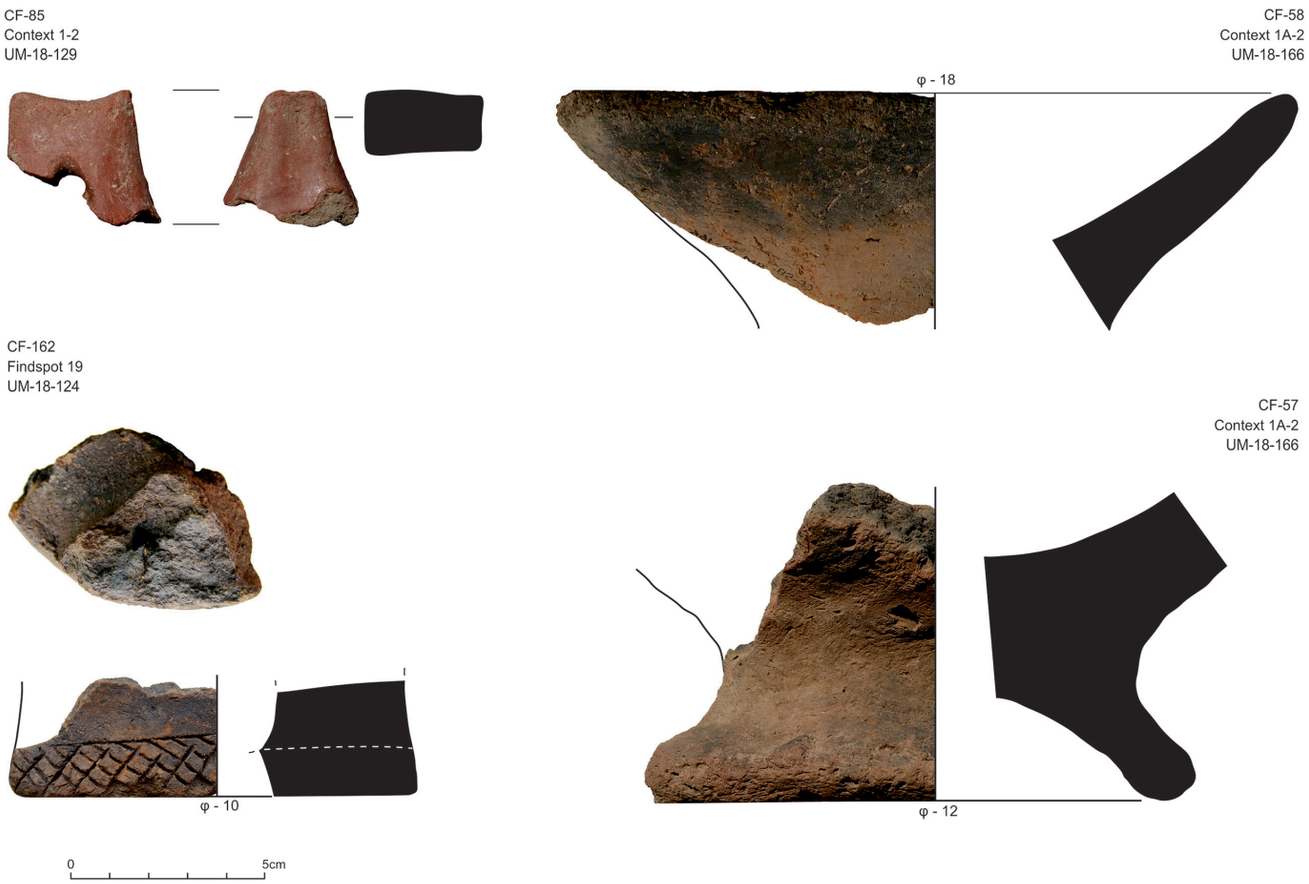

Figure 4.15. Examples of the Funj and modern pottery from Umm Marrahi (photos and drawings by Aneta Cedro)

Context		Inv. No	Number of potsherds						Type of pottery				
									Handmade				
			All	R	B	H	D	O	Coarse	Black burnished	Red burnished	Red slipped	Wheel-made
AREA 1 1-mix		HK1-18-9	19	3				1	15	3		1	
AREA 2	2-1	HK1-18-5	7	1				1	3	2			1
	2-2	HK1-18-28	8	4					7			1	
		HK1-18-29	1	1								1	
	2-4	HK1-18-33	3	1			1		2				1
	2-5	HK1-18-31	2						1	1			
	2A-2,3	HK1-18-25	5						5				
AREA 3	3-1	HK1-18-1	9	1					7	2			
	3-2	HK1-18-7	6	2			1	1	6				
	3-3	HK1-18-24	5	1					5				
		HK1-18-32	3	1					2	1			
	3-4	HK1-18-27	3	1					2		1		
	3A-2,3	HK1-18-30	3						3				
	3A-mix	HK1-18-50	2						2				
		TOTAL	**76**	**16**			**2**	**3**	**60**	**9**	**1**	**3**	**2**

Table. 4.2. Pottery count from Hosh el-Kab

in Area 1 produced 19 more (see **Table 4.2**). Coarse ware was the dominant group, consisting of non-distinctive body fragments, and at the end of the first season of the project, the attribution of the majority of this material was uncertain. Only after better-dated material from Jebel Umm Marrahi appeared, allowing us to make some correlation between the pottery from all three forts, was it possible to achieve some new chronological determinations for the Hosh el-Kab ceramics.

The pottery from Area 1, collected during the cleaning of the destroyed enclosure-wall section, may originate from different stratigraphic layers. Nevertheless, a few potsherds do find close parallels among the vessels from the Umm Marrahi fort and indirectly through this comparison can be attributed to the Post-Meroitic or transitional Christian period. This included two rim fragments of coarse ware bowls with characteristic incised decoration on the rim-top (Figure 4.17: CF-4, 7; for the parallels from Umm Marrahi see Figure 4.5) as well as wall-fragments of black burnished bowls.

The pottery from the upper-most strata in Area 2 comprised potsherds that may be dated to different chronological periods, although for most fragments, coarse and non-diagnostic, certain attribution cannot be determined. A few fragments of storage jars fit the Funj production while many body fragments with mat impression could belong to Post-Meroitic 'beer-jars'. Layer 4 delivered only three potsherds among which a wheel-made product was identified (Figure 4.18: CF-15). They were fragments of a bottle with a characteristic decoration of six incised grooves on the shoulder. This was made of the calcareous clay with abundant inclusions of fine-to-medium sand, red at the break, and with the external surface coated with a red slip. This type of vessel has a relatively long usage and can be generally dated to the Early Christian period. In the layer below, which was the last excavated unit in this Area, only two sherds were discovered. One was a large fragment of a thick-walled flat base, probably a doka, as traces of soot on the smooth inner surface suggest. The other potsherd was a small part of a black burnished bowl of a type similar to the vessels from Umm Marrahi, but as it was mentioned above, vessels of this type were known not only from the Post-Meroitic

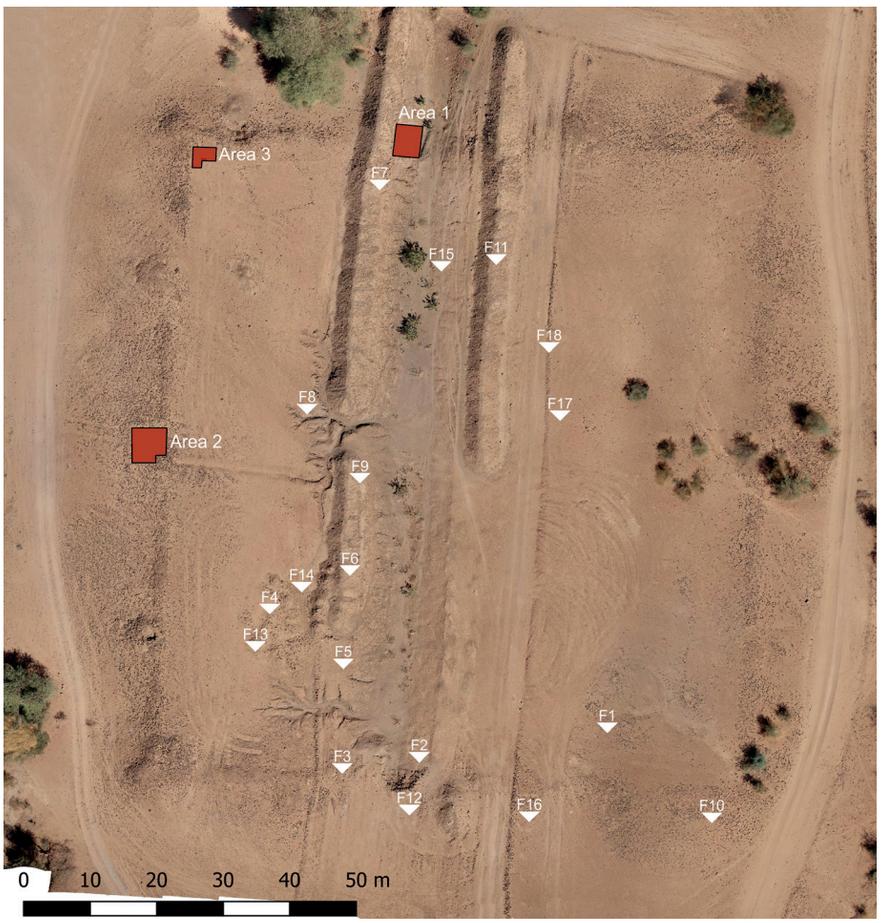

Figure 4.16. Location of pottery findspots and trenches at Hosh el-Kab (prepared by Mariusz Drzewiecki and Aneta Cedro)

period, but were produced long into the Early Christian period.

The pottery from Area 3 provided even less data for the chronological estimates. The assemblage, which totalled 31 fragments, was composed mostly of thick-walled coarse sherds and thinner fragments of vessels with a mat-impressed surface. Examples of finer products included bowls with a dark-red or black burnished surface that can be linked, with caution, to Post-Meroitic ceramic traditions.

The surface survey delivered many more sherds than the excavation of the two trenches. Within the enclosure and in its closest vicinity 18 findspots were registered and 114 pottery samples were collected (**Figure 4.16**). The bulk of the ceramics recorded at the site represented non-diagnostic potsherds associated mostly with the final phases of occupation of the sites and dated to the Funj period or to modern times. Comparison of this material with the finds from Umm Marrahi allowed us, however, to identify many fragments among the surface pottery that can be associated with the Post-Meroitic or transitional Christian periods, which were not identified previously after the first season of fieldwork (see Drzewiecki *et al*. 2018, 135–137).

The variety of vessels was not extensive, and their function mostly was associated with food processing or storage. The forms that have their closest parallels among the assemblage from the lowest layers excavated at Umm Marrahi were represented by thick-walled bowls, measuring up to 400–500mm in diameter with a decoration of small dimples along the rim (**Figure 4.17**: CF-136). Black soot on the exterior surface suggests that they were used for cooking. A new type of bowl, unknown from Umm Marrahi, was represented by a rim fragment (Figure 4.17: CF-28) with a decoration of triple zigzags of dotted lines identical to that found on a Post-Meroitic black burnished bowl from Soba (Sjöström and Welsby 1991, pl. IIIb). A small group

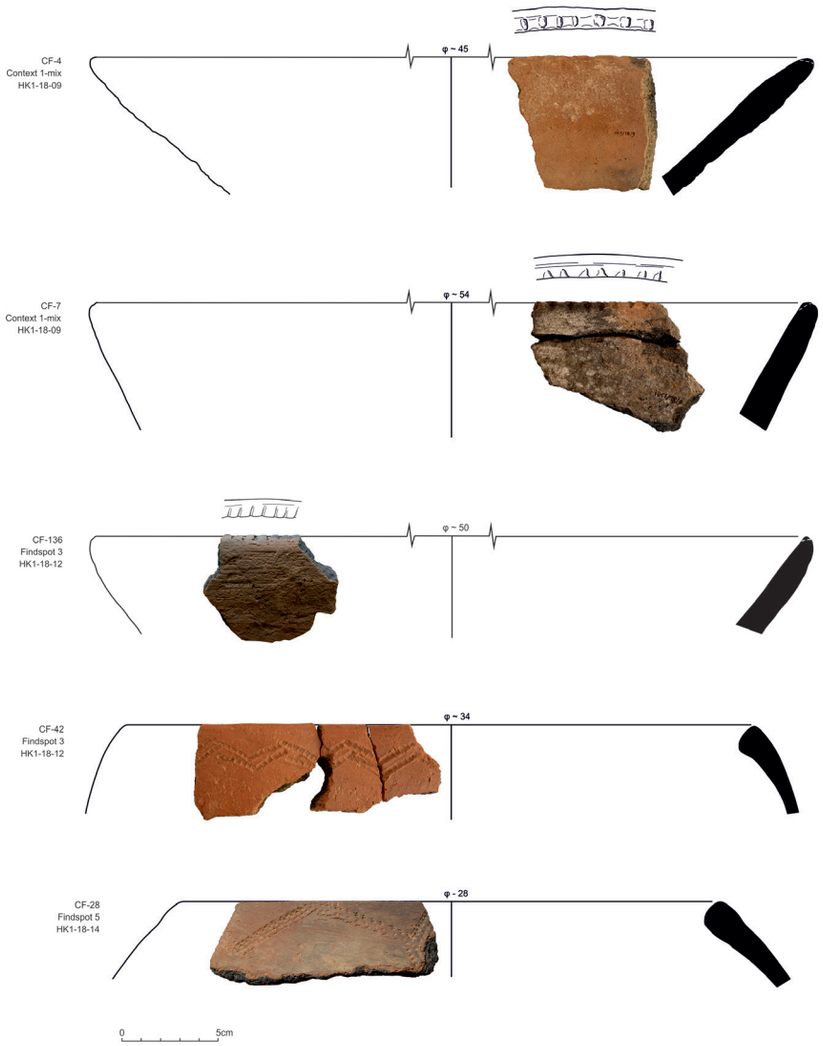

Figure 4.17. Examples of Post-Meroitic pottery from Hosh el-Kab (photos and drawings by Aneta Cedro)

of non-diagnostic fragments belonging to bowls with red-brown or black colour and a burnished surface can also now be attributed, with a high certainty, to the same chronological period. The largest concentration of this pottery was noted in the south-eastern part of the enclosure, near the remains of the circular stone structures, but they were mixed with coarse ware fragments of probable post-medieval date.

The only wheel-made potsherds from the surface were recorded in the south-western quarter of the enclosure, near the place where, until recently, remains of a building were visible on the surface. The digging of the water channel through the site almost completely destroyed this structure, and nowadays its location is marked only by the concentration of thick, white plaster and red-brick fragments. Three fragments with pinkish-red slip, two with wall carination, and one with a hole and traces of an attached small neck (**Figure 4.18**: CF-24, 27), may belong to the same vessel, most probably a pilgrim bottle.

Abu Nafisa

The research at the Abu Nafisa fort was conducted during the first season of the project, after the work at the Hosh el-Kab ended. Both sites were located at a short distance from each other and share many similarities, but when it comes to pottery there are also some significant differences between them. Excavation within two trial-trenches delivered overall slightly more pottery fragments than Hosh el-Kab, but the vast majority came only from Area 2, comprising

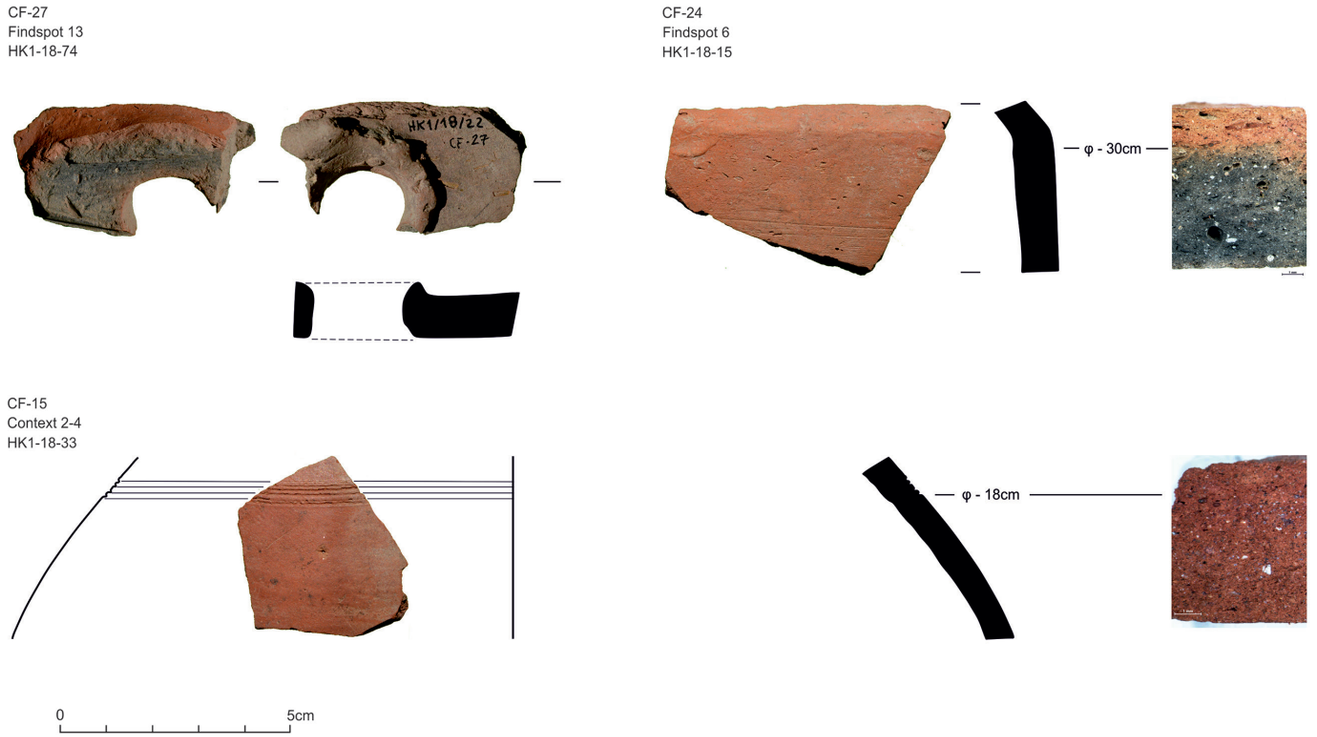

Figure 4.18. Early Christian pottery from Hosh el-Kab (photos and drawings by Aneta Cedro)

80 fragments, while barely 13 potsherds were recovered from Area 1 (see **Table 4.3**). The general characteristics of the assemblage are similar to Hosh el-Kab; the ceramics are mostly in a poor state of preservation and very fragmented. In contrast to the previous sites, there were no fragments of wheel-made pottery identified within the Abu Nafisa fort. Most of the potsherds were non-distinctive body fragments of handmade coarse ware.

The dozen fragments from Area 1 were too small a sample to base any certain assumptions on, especially considering the quality of this pottery, which was primarily coarse ware body fragments. It is worth noting, nevertheless, the presence of two sherds that can be attributed with high probability to the Post-Meroitic or transitional Christian period. One is a rim-fragment of a small burnished bowl with incised decoration on the exterior (Figure 4.20: CF-29) and the other is a large bowl, 530mm in diameter with short incised lines on the rim-top (Figure 4.20: CF-134) similar to the vessels from Umm Marrahi and Hosh el-Kab.

Area 2 delivered much more pottery than the first trench, though again, the finds were dominated by non-distinctive body fragments. While some potsherds, especially with a matt slip of pinkish colour could be of post-medieval date, there was also a group of coarse ware pottery with similar fabric and surface treatment to the pottery from the trenches at Umm Marrahi, attributed to the Post-Meroitic period. The lowest layers, from below the wall foundation (5 and below) delivered more distinctive potsherds; a rim fragment of a small bowl with carefully burnished high-gloss surface (Figure 4.20: CF-32) and another rim fragment of a black burnished medium-size bowl, 340mm in diameter (**Figure 4.20**: CF-30), which manifests clear similarity to the material excavated from the lowest layers at Umm Marrahi, and through analogy, can be dated to the Post-Meroitic or transitional Christian period.

The pottery survey within the fort area did not deliver much data, as potsherds on the surface were very scarce. Barely ten findspots were recorded from which 22 samples of pottery were collected (**Figure 4.19**). The largest concentration of ceramics was located in the vicinity of the grave of Sheikh Abu Nafisa, although this material was of a recent date. The lack of artefacts on the surface might be due to the present-day utilisation of this area, surrounded by the farmland; or it could be the result of a relatively short original occupation of this enclosure in the past.

Context		Inv. no	Number of potsherds						Type of pottery				
									Handmade				
			All	R	B	H	D	O	Coarse	Black burnished	Red burnished	Red slipped	Wheel-made
AREA 1	1-2	AN-18-51	6	1					4	1		1	
	1-3	AN-18-55	3	1					2	1			
		AN-18-59	4	1					3				
AREA 2	2-1	AN-18-57	14		1				10	2			
	2-2	AN-18-53	19	1			2	1	14	2		1	
	2-3	AN-18-54	13	3			1	1	9	2	2		
	2-4	AN-18-56	14	1			1		10	2			
	2-5	AN-18-58	9	2					6	2		1	
	2-6	AN-18-52	9						7				
	2-7	AN-18-66	2						1				
		TOTAL	**93**	**10**	**1**		**4**	**2**	**66**	**12**	**2**	**3**	**0**

Table. 4.3. Pottery count from Abu Nafisa

Figure 4.19. Location of pottery findspots and trenches at Abu Nafisa
(prepared by Mariusz Drzewiecki and Aneta Cedro)

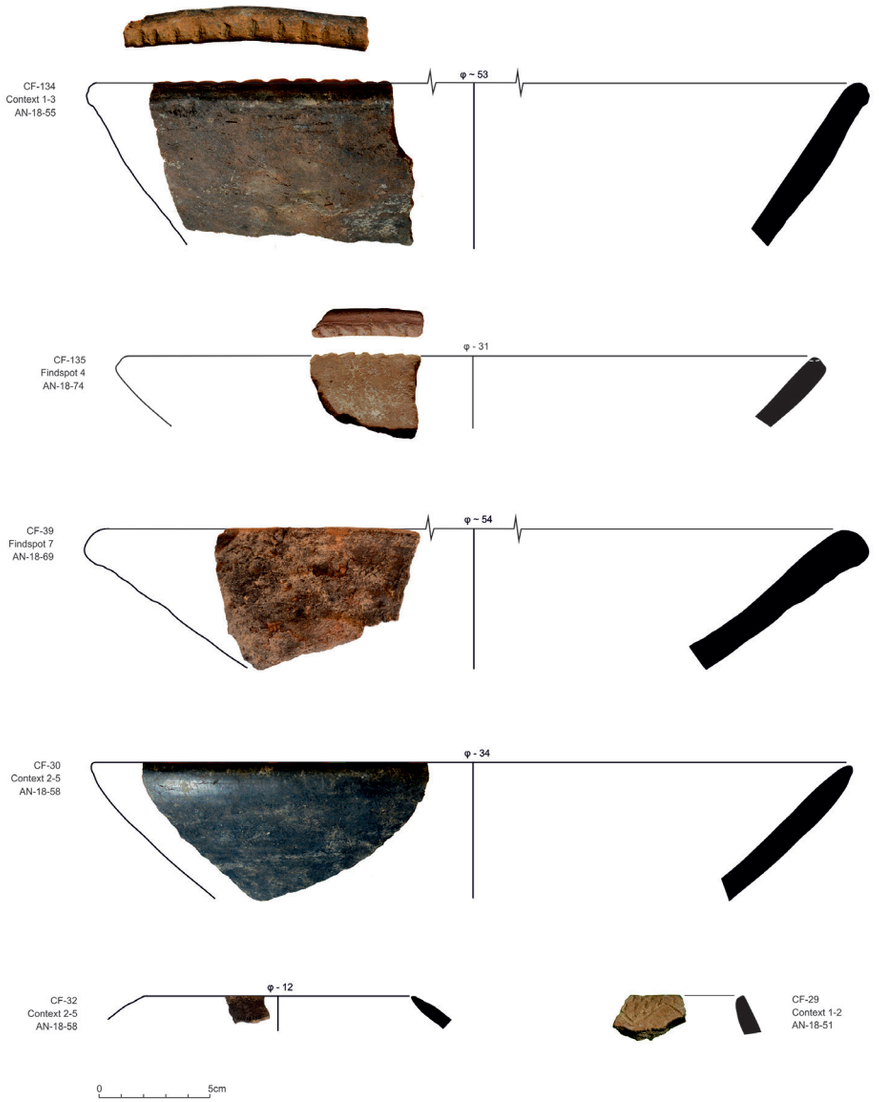

Figure 4.20. Examples of Post-Meroitic pottery from Abu Nafisa (photos and drawings by Aneta Cedro)

Conclusions

In the course of the project, the scope and methodological approach in the study of ceramics underwent some changes to the initial plan, which had to be modified and adapted to the circumstances faced on the sites. Nevertheless, it delivered enough data to answer some of the main research questions and to verify the main hypothesis of the project. For the title-question, *Did Meroitic rulers build fortifications?*, the pottery finds provide a negative answer. No traces of Meroitic pottery were identified on any of the three sites.

Regarding the chronological attribution of the construction of the forts, the best results were achieved at Abu Nafisa, where the layers stratigraphically connected with the wall's foundation and below, yielded material with Post-Meroitic traits. It needs to be remembered, however, that the conclusions here are based on a small number of finds.

Umm Marrahi was the site richest in ceramics. Although no pottery was recovered from the structure of the walls, the small excavation inside the fort provided rich material that, based on stratigraphic observations and the results of the plateau pottery survey, can be linked to the earliest phase of the fort's occupation. The ceramics from the strata contemporaneous with the construction of the fort are attributed to the Post-Meroitic/transitional Christian period. As the finds would suggest, the site was still in use during the Early Christian period, at least at the beginning. The lack of

pottery from the later Christian periods, 'Classic' and 'Late', is striking, as if the site was abandoned for a few hundred years.

At Hosh el-Kab, as in Abu Nafisa, the pottery was scarce and mostly of non-distinctive small fragments that do not allow us to establish with certainty the date of the fort's construction, though it gives strong indications for a possible chronology. The oldest pottery recognised within the enclosure, both in the trenches and on the surface, is dated to the Post-Meroitic or Post-Meroitic/transitional Christian period and the site was occupied until Early Christian period, as the presence of the wheel-made pottery suggests. The significant difference between the two closely-located forts is the lack of wheel-made products or other ceramics of the Christian period at Abu Nafisa.

There is a very clear correlation between some forms of ceramics from the three forts connected with the beginning of their occupation. Although the relative chronology provided by the ceramics has rather wide margins, it seems probable that the dates of the forts' construction were close to each other or may even partly overlap. The amount of ceramics implies, on the other hand, a different level of intensity of human activity at the forts, with Umm Marrahi being the most intensively used place, especially in the Post-Meroitic period, and Abu Nafisa having the shortest span of occupation.

The evidence for repaired vessels, dating mostly to the Post-Meroitic/transitional Christian period and recorded on all of the sites, suggests long-lasting and intensive use of these ceramics. This also supports the argument suggesting that during the period of use, the forts were witnessing some form of settled occupation.

The amount of ceramics from Hosh el-Kab and Abu Nafisa is too small a sample to draw any conclusions about the use of these enclosures as correlated with the function of the vessels. For Umm Marrahi only some general observations can be made. It also should be noted that most of the material from the late occupation of this fort comes from the surface, and thus was subjectively selected by the researcher, while the pottery from earlier phases is represented by a random excerpt of ceramics from sealed layers. Comparing these assemblages and drawing conclusions on that basis could lead to misleading results.

From the earliest phase of the forts' occupation in the Post-Meroitic/transitional Christian period, the most numerous ceramic group consisted of serving dishes (middle-size burnished bowls) and bowls for individual consumption (small burnished or polished bowls), along with coarse ware vessels for preparing meals (large bowls with traces of soot) and storage containers (bottles and 'beer-jars' for liquids and wide-mouthed jars for dry products). Some of these vessels can also be linked to Early Christian production, along with, for this period, distinctive wheel-made bowls for individual use. The repertoire of vessel-types changed slightly in the post-medieval period. Recognised forms are then dominated by storage containers of various types (large jars or bowls, bottles), and the presence of braziers or incised burners is noteworthy. The striking feature of assemblages from all historic periods at Umm Marrahi, and also at the two other forts, is the absence of imported vessels, which might have suggested trade links. No 'luxury' vessels, no glazed pottery, and no transportation amphorae from afar, were recorded at any of the three forts.

CHAPTER 5

THE ANIMAL REMAINS

Marta OSYPIŃSKA

Research into forts in the Middle Nile Valley has not, to date, included studies related to animal husbandry, consumption, hunting and breeding practices adopted by the fort builders and communities based around the sites. This paper is the first to address issues concerning this topic. Due to the nature of the archaeological investigations carried out on the three sites – Abu Nafisa, Hosh el-Kab and Umm Marrahi – relatively little osteological material was recovered. Nevertheless, it does provide preliminary data on the economy of the communities that built these monumental structures. In the light of expanding knowledge regarding the nature of animal management in the Middle Nile Valley both in antiquity and the Middle Ages (e.g. Chaix 2011; Osypińska 2018), identifying the economic foundations of the fort builders becomes a key issue. Faunal data can also be an extremely important source of information on why the forts were constructed, and how they were subsequently used.

Material

The animal remains submitted for analysis included a total of 562 fragments (fr.) of animal bones and teeth. Two small human bone fragments that were discovered amongst material from Umm Marrahi during analysis were also identified. The faunistic collections were relatively well-preserved, although this varied. Absolute dating indicated that the animal bones recovered should be dated to the two main periods when the forts were in use: the 6th–7th century and the 17th–20th centuries (Funj/modern).

The interpretation of data obtained as a result of archaeozoological investigations must, however, proceed in accordance with the statement that the faunistic collections discovered during archaeological excavations are the result of numerous taphonomic factors. From the most stereotyped and simplified perspective, archaeozoological data – to a certain extent – illustrates the preferences of a given community and the selected model of meat consumption. For reasons that are evident (cultural factors, social, environmental, political determinants, etc.), transferring the analytical results to the identification of breeding models or herd structures applied in particular communities is not a straightforward matter. Nevertheless, it should be emphasised that the ever-increasing scope of methodology at the disposal of researchers today facilitates much a broader study than just a simple statistical record of the amount of meat consumed in the past. The level of preservation of the bone collections recovered from the forts was mainly due to the destructive action of various factors at the diagenesis stage. There was a considerable (for the age of the relics) loss of organic components and the remains were fragile and powdery. This damage is the result of the extremely dry environment, significant exposure to the sun and the low density of the layer in which they lay. Damage caused by biostratinomic factors (butchery, cooking, craft-working, etc.) was much less visible.

The collection of animal remains discovered at the Umm Marrahi site deserves particular attention. In addition to the bone fragments, which due to the state of preservation can be linked to either the medieval or modern settlement, several partially mineralised bones were also recovered. The taphonomic features indicate that they originate from a much older settlement – the early Holocene. Sites of this type are known in the literature and have been the subject of research, including archaeozoological studies (Gautier *et al*. 2002).

Methods

Osteological material from the forts was subjected to the standard procedures applied in archaeozoological analyses. Taxonomic and anatomical identification was carried out and the bones were evaluated in order to determine the age and sex of the animals. The livestock remains underwent morphological analysis, which was a particularly important element of the study.

In regard to mammalian remains in particular, we aimed to identify the species as precisely as possible. Only in relation to domesticated small ruminants, due to the high morphological similarity of sheep and goat

skeletons, did we classify remains that lacked any diagnostic features that would permit precise identification of the species into one set: sheep/goat. Wherever possible, the species was determined in detail on the basis of bone and tooth morphology (Halsead *et al*. 2002; Zeder and Lapham 2010; Zeder and Pilaar 2010).

The groups were analysed taking both topographic and chronological diversity into account. The first stage of analysis focused on the taxonomic composition of all the remains that were recovered from a given site. Next, any remains linked to a clearly-dated context were isolated. These were the bones associated with the establishment phase of the forts in the 6th–7th centuries.

An important stage of the research was the collation of archaeozoological data from the forts with the data available on sites of a similar chronology. Two such sites were dated slightly earlier: Selib site 2 – settlement (Meroitic 1st–2nd century); El-Zuma – cemetery (5th century); and three were analogous: Old Dongola – the royal palace (6th–7th century); Banganarti (6th–9th century); Soba (6th–9th century). The only data from the modern period currently available, that is from Old Dongola (16th–17th century), was also included in the analysis.

The recovered animal remains were submitted for precise anatomical identification in order to identify which part of the skeleton they belonged to. On this basis, anatomical distributions of cattle, sheep and goat remains were created. If the number of elements recovered in one particular group was equal to or exceeded 70, the remains were divided further into seven groups depending on their location in the skeleton.

1. Head (H) – cranium, cornual process, hyoid bone, maxilla, mandible, teeth
2. Torso (T) – vertebrae, sacrum, sternum, ribs
3. Proximal part of the anterior limb (PPAL) – scapula, humerus, radius, ulna
4. Distal part of the anterior limb (DPAL) – carpal bones, metacarpals I–V
5. Proximal part of the posterior limb (PPPL) – pelvis, femur, patella, tibia, fibula
6. Distal part of the posterior limb (DPPL) – tarsal bones, metatarsals I–V
7. Phalanges (Ph) – proximal, middle, distal phalanx

The age of the animals at time of death assessment was based on the stage of skeletal and dental ontogenetic development. In the evaluation of dental development, the reference was the data collated by Lutnicki (1972), Müller (1973) and Gillis *et al*. (2013). Diaphyseal-epiphyseal fusion was evaluated using data from Kolda (1936), Chaplin (1971) and Gillis *et al*. (2013). The purpose of the procedures above was to enable the identification of the breeding model and to establish the main breeding profile: meat, dairy, or to obtain further useful data (Rowley-Conwy 2004).

The evaluation of animal morphology was based on bone measurement standards according to von den Driesch (1976). Traces of human activity observed on the bones were also described. These were related to the use of live animals, meat consumption, and to the processing of raw material from the animals for crafts.

Abu Nafisa

At the Abu Nafisa site, a total of 70 animal remains were discovered during archaeological investigations (**Tables 5.1, 5.2 and 5.3**). Two different taxonomic groups were identified: mammals and molluscs. The majority of the skeletal pieces found were from mammals (Class Mammalia). The second, smaller group consisted of snail and oyster shells. The material from Abu Nafisa was not as well preserved as that recovered from the other two sites studied. This is reflected by the proportion of identified bones that is very similar to the number of remains of unidentified taxonomic and anatomical origin (Table 5.3). Sheep and goat bones were recorded most frequently – a total of 27 bone and tooth fragments were identified. Of these fragments only sheep remains (*Ovis aries*) were identified precisely. The second most common group was cattle (*Bos taurus*) – though only five fragments were identified. Fragments of mollusc shells came from land snails and the Nile oyster (Table 5.3).

A total of 44 bone fragments dated to the 6th–7th century context was recorded from Abu Nafisa and of these 20 remains were identified: sheep (12 fr.), cattle (6 fr.) and Nile oyster (**Table 5.4**). From an anatomical perspective, small ruminant remains included: teeth, fragments of the mandible, ribs, humerus and radial, metacarpal, femoral and tibial bones. In terms of the anatomical distribution of the remains: elements of the head (10 fr.), torso (2 fr.), proximal thoracic limb (4 fr.) and proximal pelvic limb (11 fr.; Table 5.9). Cattle remains were less common: ribs, radius, a carpal bone and a fragment originating from the pelvis were identified; in the sections of the torso (1 fr.), proximal thoracic limb (1 fr.), distal thoracic limb (2 fr.) and from the proximal pelvic limb (1 fr.; Table 5.10).

Amongst the Abu Nafisa material only one bone from an immature animal (sheep) killed before bone

Chronology	Inv, no	SHEEP/GOAT	CATTLE	BUFFALO	HIPPOPOTAMUS	BUSHPIG	SMALL RODENT	PORCUPINE	ETHERIA NILOTICA	FISH	ZOOTHECUS	PILA	unidentified bone
		ABU NAFISA											
Mixed: 6th–7th c. / funj	AN/18/44	3											2
Mixed: 6th–7th c. / funj	AN/18/45	9									1		2
6th–7th c.	AN/18/46	2	1										16
Mixed: 6th–7th c. / funj	AN/18/47	1							1				6
Mixed: 6th–7th c. / funj	AN/18/48	2	1										
6th–7th century	AN/18/49		1										5
6th–7th century	AN/18/61								2				
6th–7th century	AN/18/92	10	2										3
		HOSH EL-KAB											
Mixed: 6th–7th c. / funj / modern	HK1	5	4					1					13
Mixed: 6th–7th c. / funj / modern	HK1/18/35	4	9								2		19
Mixed: 6th–7th c. / funj / modern	HK1/18/36	3											7
Mixed: 6th–7th c. / funj / modern	HK1/18/4	18	4										13
Mixed: 6th–7th c. / funj / modern	HK1/18/6												12
Mixed: 6th–7th c. / funj / modern	cleaning										13	2	
6th–7th century	Area 3, layer 4		1										
Mixed: 6th–7th c. / funj / modern	HK/18/2	19	4						1				34
Mixed: 6th–7th c. / funj / modern	Area 2, layer 3	4											2
		UMM MARRAHI											
2nd half of 6th – 1st half of 7th c.	UM/18/194												
Mixed: 6th–7th c. / funj / modern	18/98, Area 1	4											3
Mixed: 6th–7th c. / funj / modern	Area 1								2		3		
7th c.	Area 1A, layer 4	12	4		2								32
Mixed: 6th–7th c. / funj / modern	Area 1A, layer 2; UM/18/171	6	2									1	14
Mixed: 6th–7th c. / funj / modern	Area 1A, layer 1	45	3										30 (2 human)
Mixed: 6th–7th c. / funj / modern	Area 3B, layer 3	4											
2nd half of 6th c. – 1st half of 7th c.	Area 3B, layer 4	6	1				1						6

2nd half of 6th c.	Area 3B, layer 6, UM/18/193		5										
2nd half of 6th c.	Area 3B, layer 6, burning	9											
Mixed: 6th–7th c. / funj / modern	Area 1, layer 2	9			1								18
Surface, W part	UM/18/102 findspot 1, Surface (early holocene)				1	2							2
Surface, SE part of the hill	UM/18/130 (early holocene material)			1		1				3		1	1
Mixed: 6th–7th c. / funj / modern	UM/18/168; Area 1B, layer 3	4											
2nd half of 6th c. – 1st half of 7th c.	UM/18/192; Area 3B, layer 5	3											
2nd half of 6th c. – 1st half of 7th c.	UM/18/194; Area 3B, layer 5	5	2										43

Table 5.1. Catalogue of animal remains

	n	**%**
Identified bone	278	49.46
Unidentified bone	282 (+2 human bone)	50.54
TOTAL	**562**	**100**

Table 5.2. Animal remains recovered at the forts

TAXON	**N**
Sheep/goat *Ovis orientalis* f. *domestica*/ *Capra aegagrus* f. *domestica*	27
Cattle *Bos primigenius* f. *domestica*	5
Land snail *Zoothecus* s.p.	1
Nile oyster *Etheria elliptica*	3
NISP	**36**
Unidentified	34
TOTAL	**70**

Table 5.3. Overall distribution of remains by species: Abu Nafisa

fusion was complete was noted. The bone found was the distal epiphysis of the metacarpus that fuses with the diaphysis at the age of 20–24 months (Lasota-Moskalewska 2008). The only biostratinomic traces recorded on the Abu Nafisa remains were the direct result of fire. Five charred fragments were noted, i.e. most likely thrown into the flames, where the temperature was above 1000 degrees celsius.

TAXON	**N**
Sheep/goat *Ovis orientalis* f. *domestica*/ *Capra aegagrus* f. *domestica*	12
Cattle *Bos primigenius* f. *domestica*	6
Nile oyster *Etheria elliptica*	2
NISP	**20**
Unidentified	24
TOTAL	**44**

Table 5.4. Remains dated to the 6th–7th century: Abu Nafisa

Fragments of two types of mollusc shells may provide some data on environmental characteristics. The presence of the land snail species indicates the close proximity of grassy steppe areas, necessary as grazing areas for ruminant husbandry. Also noteworthy is the presence of fragments of Nile oyster shells. These mollusc shells are often recorded in Meroe and at medieval sites (Osypińska 2018). Nile oysters were probably consumed, but the shells are registered – as after slight processing, they were used as ‘spoons’.

Hosh el-Kab

During the investigation in Hosh el-Kab, archaeologists discovered a total of 135 remains of animal origin (**Table 5.5**). This material was more taxonomically

TAXON	N	%
Sheep/goat *Ovis orientalis* f. *domestica*/ *Capra aegagrus* f. *domestica*	34	48.57
Cattle *Bos primigenius* f. *domestica*	18	25.71
Crested porcupine Hystrix cristata	1	1.42
Land snail *Zoothecus* sp.	13	18.57
Freshwater snail *Pila africana*	4	5.71
Nile oyster *Etheria elliptica*	1	
NISP	**71**	**100 / 51.85**
Unidentified	65	48.14
TOTAL	**136**	**100**

Table 5.5. Distribution of remains by species: Hosh el-Kab

TAXON	N
Sheep/goat *Ovis orientalis* f. *domestica*/ *Capra aegagrus* f. *domestica*	
Cattle *Bos primigenius* f. *domestica*	1
Land snail *Zoothecus* s.p.	
Nile oyster *Etheria elliptica*	1
NISP	**1**
Unidentified	0
TOTAL	**1**

Table 5.6. Remains dated to the 6th–7th century: Hosh el Kab

diverse than the Abu Nafisa finds. However here, as in Abu Nafisa, the remains of only two systematic groups were recorded: mammals and molluscs. The collection was relatively well-preserved, comparable to that of Abu Nafisa, although the fragments were slightly larger, with better preserved diagnostic elements (those from Abu Nafisa were finely fragmented). The number of identified specimens (NISP) was slightly higher in relation to unidentified remains (Table 5.5).

The majority of material from Hosh el-Kab, as in Abu Nafisa, consists of bone pieces from small ruminants: sheep and goats, though there are slightly more goat remains. Sheep and goat bone fragments account for 48.57% of NISP (Number of Identified Specimens). The next group in terms of number were cattle bones, constituting 25.71% of NISP (Table 5.5). The third species identified was the crested porcupine (*Hystrix cristata*). Only one bone of this animal was registered, and that was in a set where the chronology is undetermined. Unfortunately, only one fragment of cattle bone found at this site could be associated with a clearly-dated context (**Table 5.6**).

Molluscs from the Hosh el-Kab site consisted of the shells of two species: the land snail (*Zoothecus*) and the water snail (*Pila africana*), and one Nile oyster shell fragment (Table 5.5). It is difficult to determine whether snail shells were at the site as a direct result of human activity – it cannot be ruled out that the Pila snail may have been part of the inhabitants' diet. This species is frequently noted in early Holocene-Neolithic sites. The presence of both species of snails may indicate the environmental conditions of the Hosh el-Kab fort. Within close proximity to the site there is flowing water, and areas covered with grass and thickets.

In anatomical terms, there were more skeletal remains of small ruminants than was the case at Abu Nafisa. During analysis, fragments of the cranium, maxilla, teeth, mandible, vertebrae, ribs, scapula fragments, single pieces of the humerus, radius, ulna, carpal bones, metacarpus, and several pieces of pelvic, femoral and tibial bones were registered (Table 5.9). From the perspective of the technological breakdown therefore, almost all parts of the carcass (apart from the distal pelvic limb and digits – the smallest pieces of the skeleton) are represented.

The list of domestic cattle bones is significantly shorter (Table 5.10) and includes fragments of teeth, the mandible, ribs, scapula, humerus, radius and tibia (Table 5.10). The technological breakdown reveals pieces of the head (4 fr.), torso (1 fr.), proximal anterior limb (16 fr.) and proximal posterior limb (1 fr.). In the material from Hosh el-Kab, only one fragment of a small ruminant bone with traces of charring was noted.

Umm Marrahi

The Umm Marrahi archaeological investigation delivered the most faunal material (Table 5.7). It was also the most taxonomically diverse collection. The analysis of Umm Marrahi finds revealed the remains of mammals, fish and molluscs. The percentage of NISP was similar to the other sets – about half of the collections had preserved features that enabled taxonomic and anatomical identification (**Table 5.7**). The level of preservation of the animal remains from Umm Marrahi accurately reflected the multi-phase occupancy of the site. The collection includes both mineralised bone

TAXON	N	%
Sheep/goat *Ovis orientalis* f. *domestica*/ *Capra aegagrus* f. *domestica*	107	73.80
Cattle *Bos primigenius* f. *domestica*	17	11.72
African Buffalo *Syncerus caffer*	1	0.70
Bushpig *Potamochoerus larvatus*	3	2.06
Hippopotamus *Hippopotamus amphibious*	5	3.44
Rodent *Rodentia* sp.	1	0.70
Catfish *Siluriformes* sp.	4	2.75
Nile oyster *Etheria elliptica*	2	1.40
Land snail *Zoothecus* sp.	3	2.06
Freshwater snail *Pila africana*	2	1.40
NISP	**145**	**48.98**
Unidentified	149 (+2 human bones)	51.02
TOTAL	**296**	**100**

Table 5.7. Distribution of remains by species: Umm Marrahi

fragments, corresponding taphonomically to early Holocene collections, and bone pieces preserved in a manner characteristic of medieval and modern material, and usually characterised by a loss of organic bone components – collagen.

The early Holocene phase of settlement on Umm Marrahi hill is linked to pieces of bone from the African buffalo (*Syncerus caffer*), bushpig (*Potamochoerus larvatus*), hippopotamus (*Hippopotamus amphibius*), catfish (*Siluriformes*), and probably some shells, especially Pila. The remains of these animals are not only characterised by advanced mineralisation, which is common for early Holocene material, but the species composition is also typical of Neolithic sites and falls into the older analysis (Gautier *et al*. 2002).

There were 131 fragments in total from the context associated with the establishment of the Umm Marrahi fort in the 6th–7th century (Table 5.8). Among those identified, the remains of sheep (*Ovis aries*) and goats (*Capra hircus*) were recorded (35 in all, of which 21 were classified as sheep and four as goats). There were 12 fragments of skeletal cattle remains. In addition to livestock, two fragments of hippopotamus teeth and a small rodent bone were also recorded (**Table 5.8**).

Anatomically, the skeleton of small ruminants was most fully represented in material from Umm Marrahi

TAXON	N
Sheep/goat *Ovis orientalis* f. *domestica*/ *Capra aegagrus* f. *domestica*	35
Cattle *Bos primigenius* f. *domestica*	12
Hippopotamus	2
Rodent	1
NISP	**50**
unidentified	81
TOTAL	**131**

Table 5.8. Remains dated to the 6th–7th century: Umm Marrahi

BONE	Abu Nafisa	Hosh el-Kab	Umm Marrahi
Cranium		1	6
Proc. Cornuales			
Maxilla		1	7
Dentes	6	17	19
Mandibula	4	7	8
Vertebrae		1	7
Costae	2	6	11
Scapula		3	2
Humerus	2	1	10
Radius	2	1	2
Ulna		1	
o. carpi		1	2
o. metacarpi	1	1	3
Pelvis		2	2
Femur	7	12	11
Tibia	3	2	7
Talus			1
Calcaneus			
o. tarsi			1
o. metatarsi			5
Ph proximalis			2
Ph media			1
Ph distalis			

Table 5.9. Distribution of anatomical remains: sheep and goats

(Table 5.9). Fragments of the cranium, maxilla, teeth, mandible, vertebrae, ribs, scapula, humerus, radius, carpal bones, metacarpus, pelvis, femur, tibia and tarsus bones, metatarsus and middle and distal phalanx bones were recorded (**Table 5.9**). All sections of the animal carcass were registered.

BONE	Abu Nafisa	Hosh el-Kab	Umm Marrahi
Cranium			
Proc. Cornuales			
Maxilla			
Dentes		1	1
Mandibula		3	
Vertebrae			3
Costae	1	1	
Scapula		3	
Humerus		10	1
Radius	1	3	
Ulna			
o. carpi	2		
o. metacarpi			1
Pelvis	1		
Femur			1
Tibia		1	2
Talus			2
Calcaneus			
o. taris			
o. metatarsi			5
Ph proximalis			1
Ph media			
Ph distalis			

Table 5.10. Distribution of anatomical remains: cattle

The remains of domestic cattle bones included fragments of teeth, vertebrae, humerus, metacarpus, femur, tibia, talus, metatarsus and proximal phalanx bones (**Table 5.10**). The breakdown of the material revealed elements of the head, torso, parts of the proximal and distal anterior limb, parts of the proximal and distal posterior limb, however, no phalanx fragments were identified.

In the Umm Marrahi collection, there was only one bone from a sheep that was slaughtered before reaching the age of 20–24 months. One sheep bone also had traces of charring.

Among the remains from Umm Marrahi, only two fragments held any metric value. These were sheep and cattle bones. The metric value of a sheep distal metatarsal epiphysis (Bd - 25.86) was similar to those found in Upper Nubia on Makurian sites. This indicates the traditional breed of the Middle Nile Valley – the Sudan Desert sheep. Regarding cattle, measurements also came from the distal metatarsal epiphysis (Bd - 50.93). On the scale created for the cattle population from north-east Africa, this is typical of taurine short-horned cattle. Similar values were noted most frequently in late-Makurian sites (Old Dongola and Banganarti, 13th–14th century) as well as in Meroitic contexts in Jebel Barkal (1st–2nd century) (Osypińska 2018).

Archaeological data from the forts in light of other sites

Bearing in mind that all three investigated sites were very similar both in terms of function and the chronology of their establishment, it was justifiable to consider the material on a more general level – as a collection of fauna from forts (**Table 5.11**). This permitted certain statistical analyses, which also enabled comparative analyses with other sites. The majority of the material from the forts dating from the period of their construction was the remains of small ruminants, which constituted 66.2% of NISP. The second livestock species registered in these collections was cattle, the remains accounting for 26.7%. Additionally, individual pieces of bone from a hippopotamus, rodent and oyster were noted.

TAXON	N	%
Sheep/goat	47	66.2
Cattle	19	26.7
Hippopotamus	2	2.8
Rodent	1	1.4
Nile oyster	2	2.8
NISP	**71**	**100**

Table 5.11. Species dated to the 6th–7th century recovered at the forts – general overview

The above data, both taxonomic and the characteristics of the anatomical breakdown, allows for a hypothesis on the nature of fauna collections from the forts to be proposed. The absence of species that were 'not consumed' or were of negligible value in terms of meat supply (dogs, cats, donkeys, camels), and the lack of bone fragments of low consumer value (phalanges) suggest that we are concerned almost exclusively with consumer waste. At this point, an initial hypothesis can be submitted that the bone material analysed is kitchen waste. However, there is no evidence that animals were reared or slaughtered in, or near, the forts. In the light of the data available, it seems that during the construction phase and when the forts initially were in use, meat was brought to the site and eaten there. No evidence of

	ALWA	MAKURIA		FORTS
	Soba (6th–9th *c.*)	Old Dongola (6th–7th *c.*)	Banganarti (7th–9th *c.*)	Abu Nafisa, Hosh el-Kab, Umm Marrahi
Sheep/goat	42.4%	45.91%	42.85%	66.2%
Cattle	55.0%	35.01%	41.33%	26.7%
Swine	–	13.02%	11.74%	–
Dog	0.1%	0.02%	0.08%	–
Donkey	0.04%	0.02%	0.17%	–
Dromedary	0.1%	0.05%	2.95%	–
Cat	0.02%	0.57%	–	–
TOTAL DOMESTIC	**97.9%**	**98.39%**	**99.15%**	**92.9%**
Giraffe	0.04%	–	–	
Large antelope	0.01%	0.03%	0.08	
Dorcas gazelle	0.02%	0.45%	–	
Gazelle undet.	0.03%	–	–	
Warthog / Bushpig	0.01%	–	–	
Hippopotamus	–	–	–	2.8%
Lion	0.01%	–	–	–
Fox	0.1%	–	–	–
Carnivore undet.	0.01%	–	–	–
Hare	0.04%	–	–	–
Micromammals	0.3%	–	0.08	1.4%
Bird	0.07%	0.51%	0.08	–
Crocodile	0.01%	–	–	–
Reptile undet.	0.03%	–	–	–
Fish	0.3%	4.34%	0.17	–
Molluscs	0.9%	0.02%	0.08	2.8%
TOTAL WILD	**2.1%**	**1.6%**	**0.85%**	**7%**

Table 5.12. Percentage of remains from the forts and chronologically analogous sites in Makuria (Old Dongola and Banganarti) and Alwa (Soba)

other activities related to the rearing, use of animals, and their slaughter were identified.

This hypothesis is supported by a comparison with archaeozoological data from other sites that are similar in chronological and geographical terms (Osypińska 2003; 2005; 2010; 2018). The collection from Soba, the capital of Alwa (Chaix 1998), was selected for such a comparison. It is a site located relatively close to the forts, and of a similar chronological date. Material was also available from two important Makurian archaeological sites, dated between the 6th–9th centuries: Old Dongola and Banganarti. Due to the defensive nature of the early Makurian capital, the material from Old Dongola in particular seems especially valuable for this study. A general comparison also applied data from the settlement site of Selib site 2. Although it is a settlement that was in use much earlier than the construction of the forts, it is one of the very few settlement sites from the Meroitic period, therefore this data was deemed significant for the purposes of the study. In one of the summaries (**Table 5.13**), the data from the necropolis in Zuma was included in the analysis for purposes of information. Chronologically, this collection is very close to the period of the forts (5th century AD), but functionally it is completely different.

One of the main features of the osteological material recovered at the forts is the poor level of taxonomy. This is especially noticeable when compared to Soba,

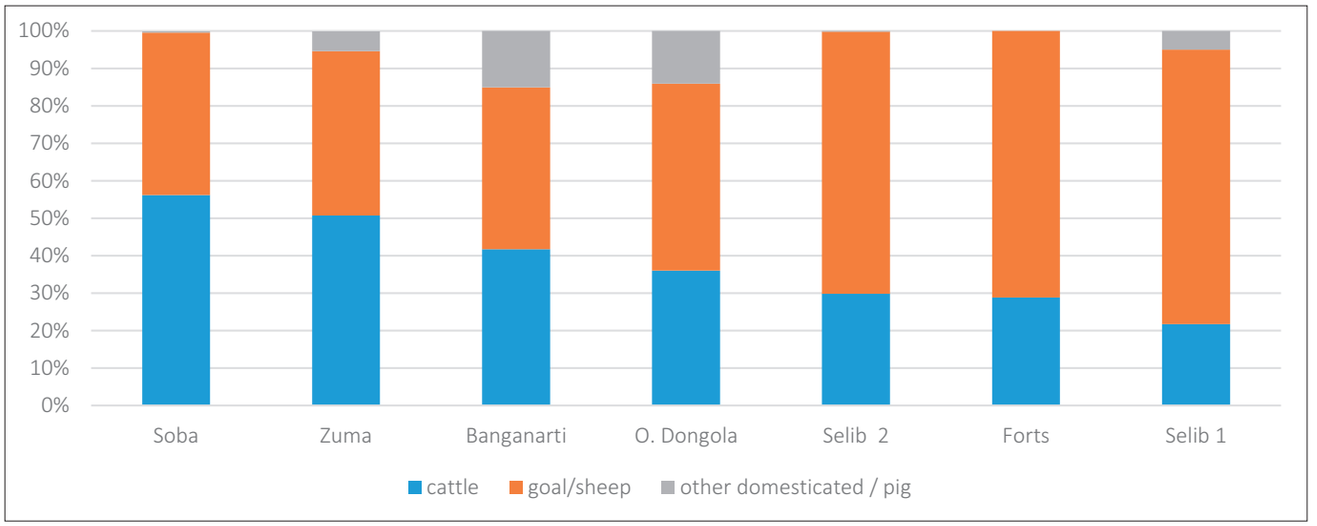

Figure 5.1. Percentages of animal remains on settlement sites in the Middle Nile Region (prepared by Marta Osypińska)

	Cattle	Sheep/ Goat	Other/ Swine
Soba (6th–9th *c.*)	56.2%	43.4%	0.3%
Ez-Zuma (5th *c.*)	50.7%	43.9%	–
Banganarti (7th–9th *c.*)	41.7%	43.2%	15.1%
Old Dongola (6th–7th *c.*)	36.0%	49.9%	14.1%
Selib st. 2 (1st–2nd *c.*)	29.8%	70.0%	0.2%
Forts (6th–7th *c.*)	28.8%	71.2%	–
Selib st. 1 (12th–13th *c.*)	21.7%	73.3%	5.0%

Table 5.13. Percentage of species according to economic significance in early medieval and Meroitic centres

which is the closest in terms of geography and chronology. The second major difference, between the proportions of species recorded both in Soba and also in the early Makurian sites, is the much higher percentage of small ruminant remains and significantly lower percentage of cattle in the forts. In early medieval Soba, cattle accounted for as much as 55% of NISP, while in the forts the remains of this species accounted for only 26.7%. In early medieval Makuria, the percentage of cattle remains was clearly lower than in Soba (**Table 5.12**), additionally there is clear evidence of pigs reared for meat. There were no remains of this species in the forts. The comparison reveals however, that in many respects the archaeozoological data from the forts is similar to the data from the only site with a lower status – the provincial Meroitic settlement of Selib (**Figure 5.1**).

Even clearer analogies emerge from a comparison that only takes into account the most important species intended for consumption. Despite chronological differences, the archaeozoological data from the forts is closest to the proportions of the remains recorded in the provincial settlement. On the other hand, the image of the consumption model from the forts varies significantly in terms of the percentage of the remains of the most important species from sites of a high socio-political rank: capital cities and monumental necropolises, despite the fact that it was the closest material chronologically.

Summary

The results of archaeozoological research of bone material from three sites: Abu Nafisa, Hosh el-Kab and Umm Marrahi, indicate very similar consumption patterns between the communities that participated in the construction and the early stages when the forts were in use. Although it needs to be recognised that the analyses cover very limited collections, it seems that at this preliminary stage certain theses can be proposed that should be verified across forums in later stages of research. Analysing the collections dated to the 6th–7th century (based upon ceramic and ^{14}C dating), the forts appear to have been used for a short period of time after construction, following which they were abandoned. Meat or pieces of animal carcasses were probably brought here and only subjected to final preparation – cooking or roasting – on site.

The main sources of meat were small ruminants: sheep and goats. This is typical of sites in the central Nile Valley dating from the Kerma period to modern times (Osypińska 2018); however, there is no data to indicate that hunting or fishing, in the consumption model applied to the people connected to the forts, were of significance. This is also a feature characteristic of Nubian osteological complexes, whether ancient, medieval or modern. Considering that the remains of wild animals, both mammals and fish, are well-preserved in the material, it seems that this is a phenomenon that points to a very limited scope of exploitation of the resources in the wild environment after prehistory. This is a feature that researchers have highlighted in numerous papers (e.g. Chaix 2010). A comparative analysis of archaeozoological data from forts and other sites with a similar chronological date of construction provided very interesting data. Here too, a hypothesis can be submitted that, during their establishment and early functioning, the forts were not centres that held a prestigious socio-demographic role. The consumption model in the centres investigated indicates that they were not the seat of the social elite in the 6th and 7th centuries. On the contrary, archaeozoological data suggests that the consumption model corresponds almost perfectly to that of provincial settlements inhabited by the 'common' population, both in the earlier (Selib site 2: 1st–2nd century) and later (Selib site 1: 12th–13th century) periods.

The anatomical breakdown of ruminant remains may suggest the distribution of meat within the sites themselves and across a slightly wider area. This is especially noticeable in relation to cattle remains, where there is no record of any remains of the 'head' nor digits in the investigated collections. These are parts that are removed from the carcass in the initial stages of butchering, the lack of which may suggest that the waste is rather 'table scraps', and that the slaughter and initial stages of carcass preparation for consumption occurred elsewhere. The shape of the bone fragments from the three sites discussed may also indicate how the meat was prepared. It is most likely that the meat was cut on the bone and added to sauces in this form.

The results of the archaeozoological analyses from Abu Nafisa, Umm Marrahi and Hosh el-Kab are preliminary, due to the small number of samples. However, the initial results have already supplied interesting information on animal management models applied in functionally specific facilities, which defensive structures undoubtedly are. The obtained data places these sites well into the current archaeozoological knowledge about the Middle Nile Valley region. Most certainly, in the field of animal management, the communities inhabiting the forts relied on ruminants: sheep, goats and cattle. At the current time, no information is available that would suggest these animals were bred within the defensive walls. It does seem, however, that the remains recovered were in fact 'table scraps', and it cannot be ruled out that meat was brought from outside the area covered in this study. It is highly likely that the forts functioned in an environment that favoured grazing ruminants.

CHAPTER 6

AN APPROXIMATION OF THE CHEMICAL COMPOSITION OF THE PLASTER FROM THE HOSH EL-KAB FORT – AS DETERMINED BY INSTRUMENTAL METHODS (XRF, SEM-EDS, FTIR, Raman spectroscopy, XRD)

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Andrzej OSTROWSKI, and Grażyna Zofia ŻUKOWSKA

Introduction

A multi-instrumental approach, based on complementary analytical methods, was performed to gain knowledge of the basic characteristics and chemical composition of plaster from the Hosh el-Kab fort. Only one sample of plaster, collected during the survey at Hosh el-Kab in 2018, was available for analysis. The plaster was collected (as a surface find) in the unpreserved building of undefined function within the fort's defensive walls. The walls of the building were made of irregular stones. A few fragments of red brick were noticed in the debris.

To analyse the plaster within a wider context, two other samples were chosen as a comparative material. One came from Dangeil, the kiosk in front of the Amun temple (Anderson and Mohammed Ahmed 2008, 43), and the other from Soba, Building E (Welsby 1998, 272). The selected samples are from sites located in the region of the junction of the two Niles, and along the Nile up to the Fifth Cataract (**Figure 6.1**).

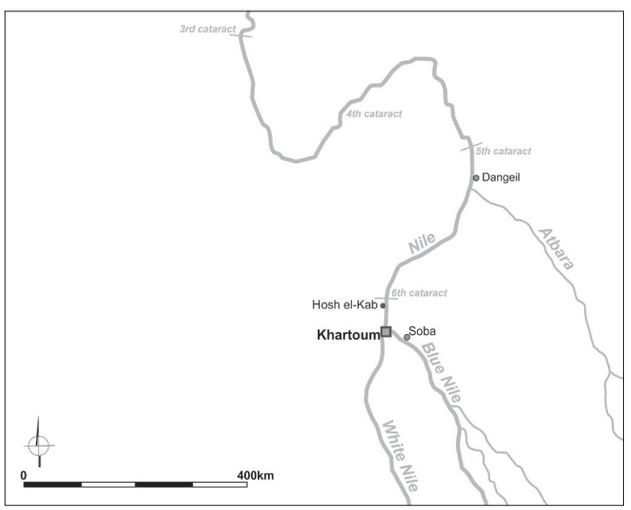

Figure 6.1. Map with the sites from which the analysed samples and comparative samples originated

Samples of plaster – macroscopic observation

All three samples present fragments of lime plasters with polished surfaces. The sample from Hosh el-Kab presents a dense plaster of *c*. 150mm thickness. In the case of this plaster, an additional layer of whitewash was applied (**Figure 6.2a, b**). Its presence could indicate

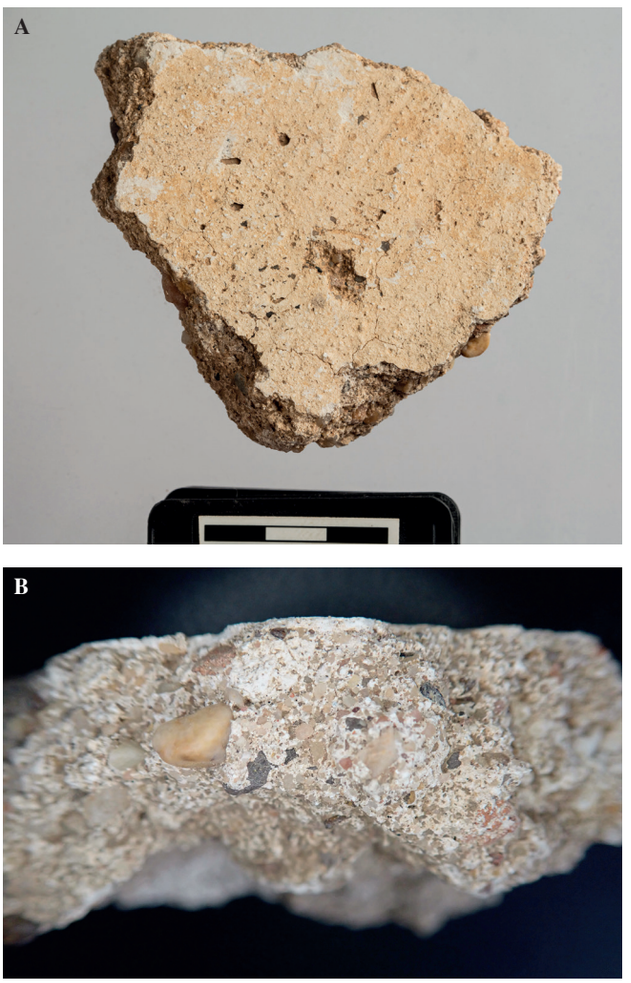

Figure 6.2. The sample from Hosh el-Kab.
A: front view (photo Miron Bogacki); B: side view with visible layer of whitewash and different aggregates (photo Cristobal Calaforra-Rzepka)

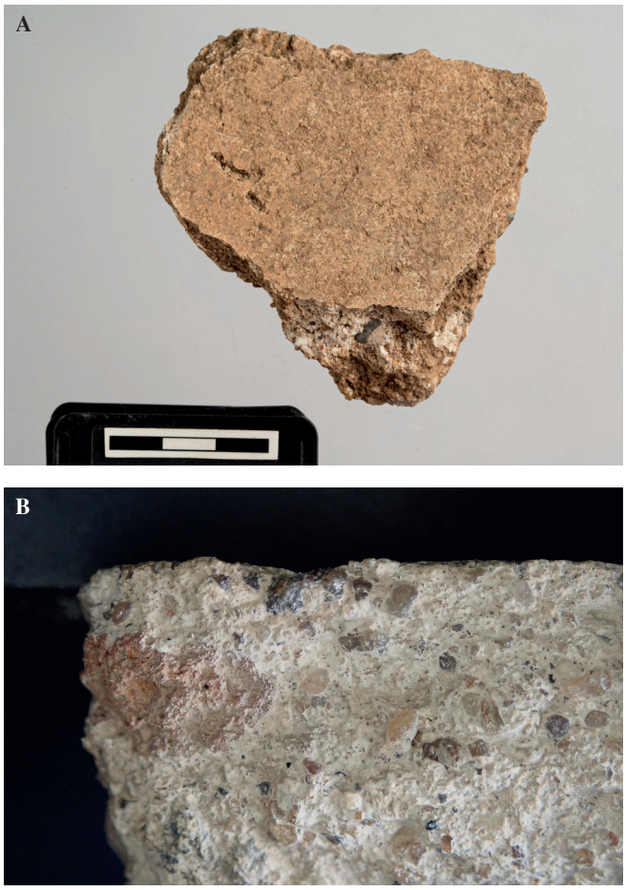

Figure 6.3. The sample from Soba.
A: front view (photo Miron Bogacki); B: fragment of side view with visible inclusions of brick (photo Cristobal Calaforra-Rzepka)

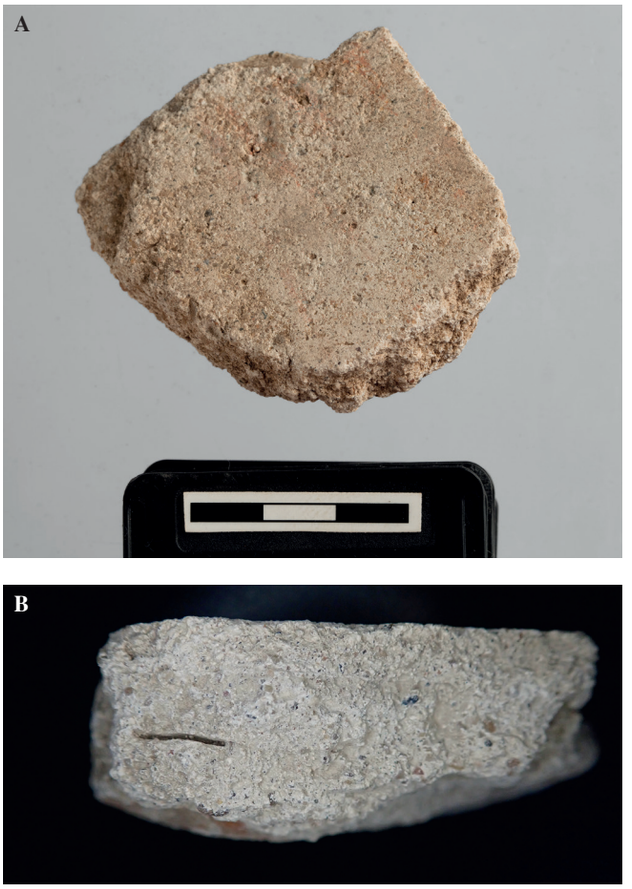

Figure 6.4. The sample from Dangeil.
A: front view (photo Miron Bogacki); B: side view with visible straw negatives (?) (photo Cristobal Calaforra-Rzepka)

that this is a fragment of an interior plaster. Different aggregates with recognisable grain particles of sand and even small amounts of different coloured gravel are visible.

The sample from Soba presents a similar type of plaster. It is *c*. 8–20mm thick. The aggregates contain quartz particles with a larger addition of fine gravel. Additionally, sparse small pieces of crushed brick are visible (**Figure 6.3a, b**).

The sample from Dangeil is the most uniform in structure. The quartz particles are not that numerous and of a rather small size. Two elongated indents of *c*. 8mm in length could be negatives of straw (**Figure 6.4a, b**).

Analytical procedure

X-ray fluorescence (XRF) spectrometry (portable spectrometer, Tracer III-SD, Bruker) was used to obtain information about the elemental composition of the plaster fragments in a non-invasive and non-destructive way. A vacuum setup coupled to the spectrometer was applied to enhance the sensitivity of the measurements for light elements. At least three measurements (45kV, 23.1μA, 60s) were performed for each sample. Spectra were registered from an area of *c*. 50mm².

Scanning electron microscopy combined with energy dispersive X-ray spectrometry (SEM-EDS) was used to get insight into the structure of the samples and elemental distribution within the examined plasters. For this purpose, small fragments of samples were embedded in epoxy resin (Epofix, Struers) and polished with abrasive papers. SEM images of prepared cross-sections were taken by FE-SEM Merlin microscope (Zeiss). Elemental analysis was carried out by means of EDS detector Quantax (Bruker) at 15kV. To avoid electrostatical charging of the sample surface each cross-section was plasma sputtered with a thin film of Au-Pd alloy (*c*. 2nm) before measurements were taken.

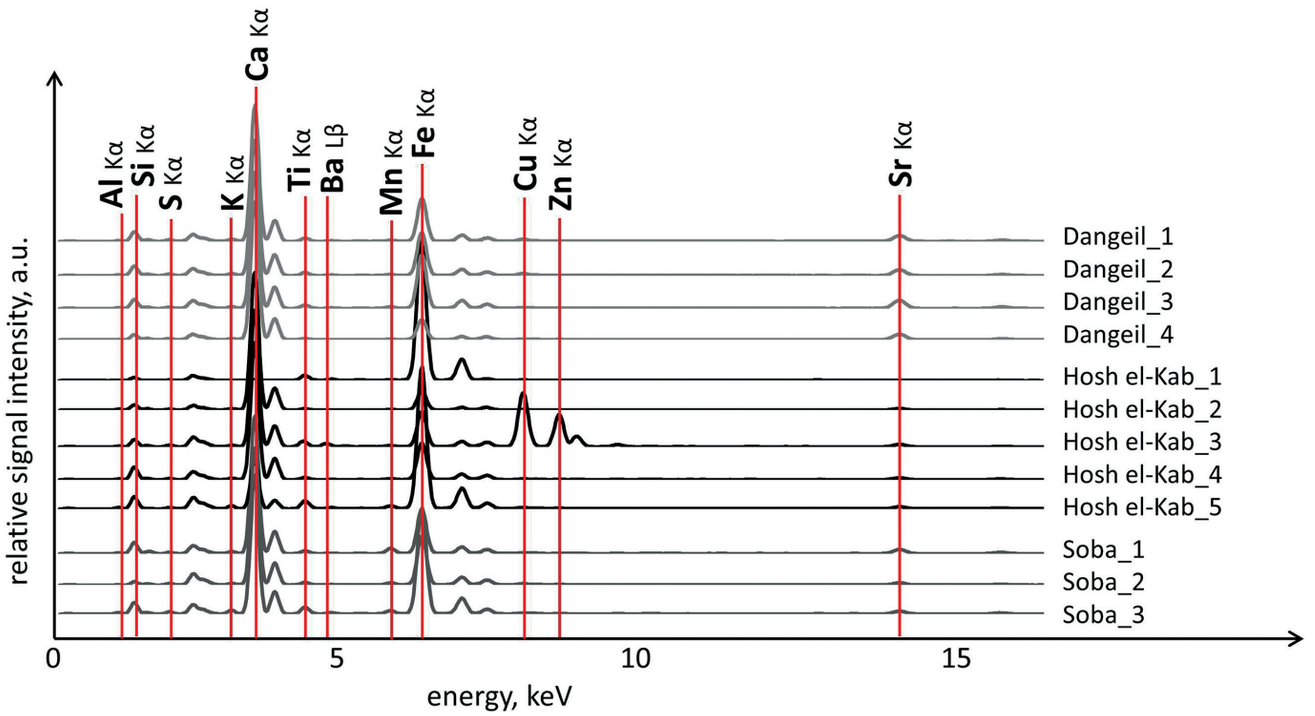

Figure 6.5. All XRF spectra registered for samples from Hosh el-Kab, Dangeil and Soba

Molecular data was provided based on the analyses with the use of Fourier Transform Infrared Spectroscopy (FTIR), Raman spectroscopy and powder X-ray diffraction (PXRD). The sample examined, and the comparative material samples, were ground with a mortar in order to homogenise the samples and to obtain a unified structure of results.

The FTIR spectra were recorded on a Nicolet Avatar System 370 FTIR spectrometer equipped with a Golden Gate ATR accessory. The spectral resolution was 2cm^{-1}. Each spectrum was averaged from 32 scans. Three spectra were recorded for each sample.

Raman spectra were recorded on a Nicolet Almega Dispersive Raman Spectrometer equipped with confocal microscope and motorised stage. The spectra were obtained with the use of a 780nm laser and 1200 lines/mm grating. The exposure time was set up to 30s.

Laboratory powder X-ray diffraction patterns were recorded at room temperature on a Bruker D8 Advance diffractometer equipped with a LYNXEYE position sensitive detector, using Cu Kα radiation (λ = 0.15418nm). The data were collected in the Bragg–Brentano (θ/θ) horizontal geometry (flat reflection mode) between 4° and 60° (2θ) in a continuous scan, using 0.03° steps, 384 s/step. The diffractometer incident beam path was equipped with a 2.5° Soller slit, and a 1.14° fixed divergence slit, while the diffracted beam path was equipped with a programmable antiscatter slit (fixed at 2.20°), a Ni β-filter, and a 2.5° Soller slit. Data was collected under standard laboratory conditions (temperature and relative humidity).

Results

Registered XRF spectra indicate a large chemical similarity between the analysed plaster samples in terms of elemental composition (**Figure 6.5**). Ca, Fe, Si, Sr, Al, S, K, Mn and Ti were determined in every sample.

The results obtained for two locations on the Hosh el-Kab plaster fragment can be distinguished as: (i) HK1 is probably an iron concretion, (ii) HK3 area, unlike all other samples, contains barium (Ba). Considering that the studied area is characterised by increased sulfur (S) content, it can be assumed that both the barium and calcium (Ca) present are in the form of sparingly soluble sulfates.

EDS mapping (**Figure 6.6**) of the sample from Hosh el-Kab enabled Si and O rich areas, assigned to mineral transparent grains within the Ca, C and Mg rich background, to be distinguished. Tiny mineral impurities containing Ti and Fe could be observed as well. Co-distribution of Si and O probably denotes the presence of quartz (SiO_2) and other silicate aggregates (Al

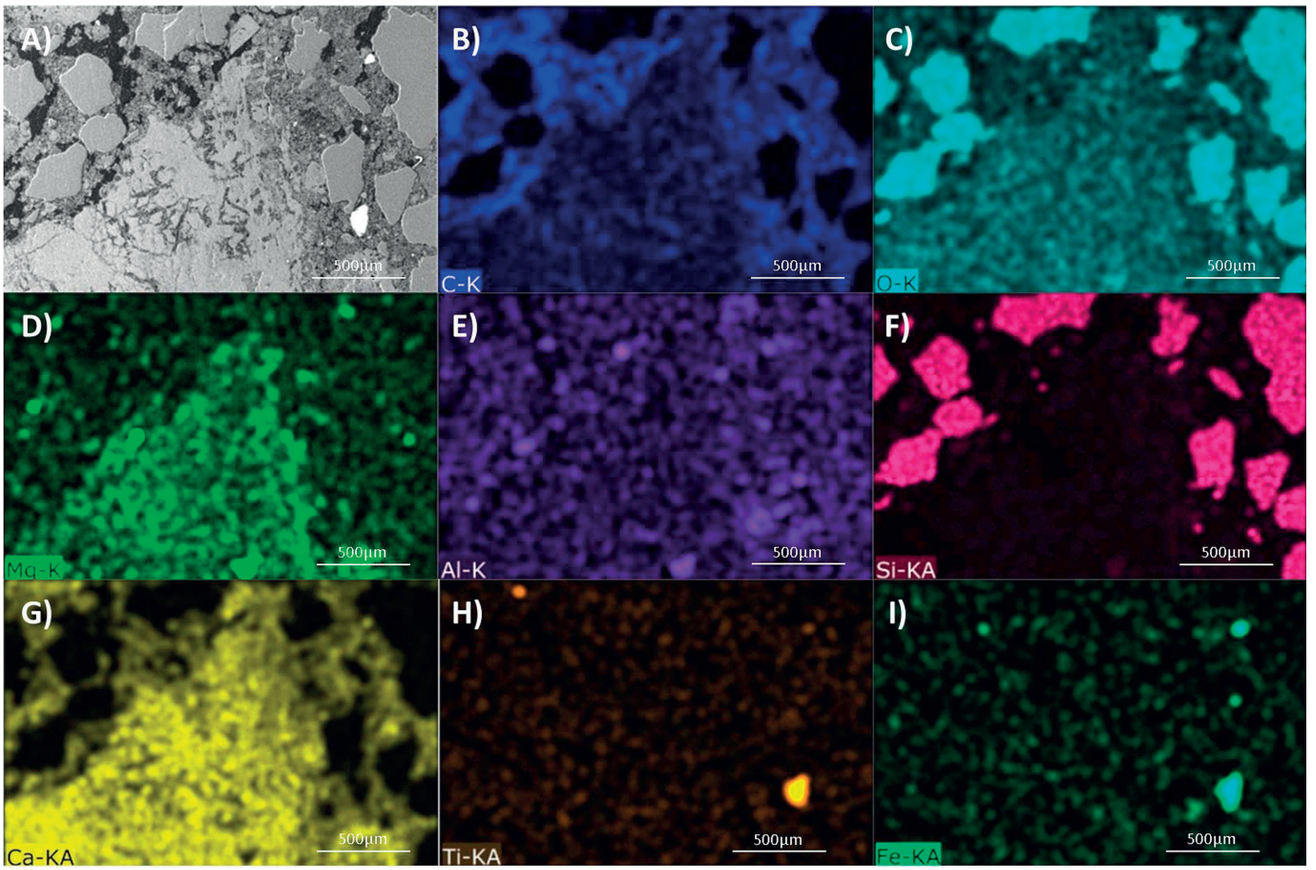

Figure 6.6. A. SEM image of Hosh el-Kab plaster cross-section combined with EDS elemental distribution maps depicted for B. carbon (C); C. oxygen (O); D. magnesium (Mg); E. aluminum (Al); F. silicon (Si); G. calcium (Ca); H. titanium (Ti); I. iron (Fe)

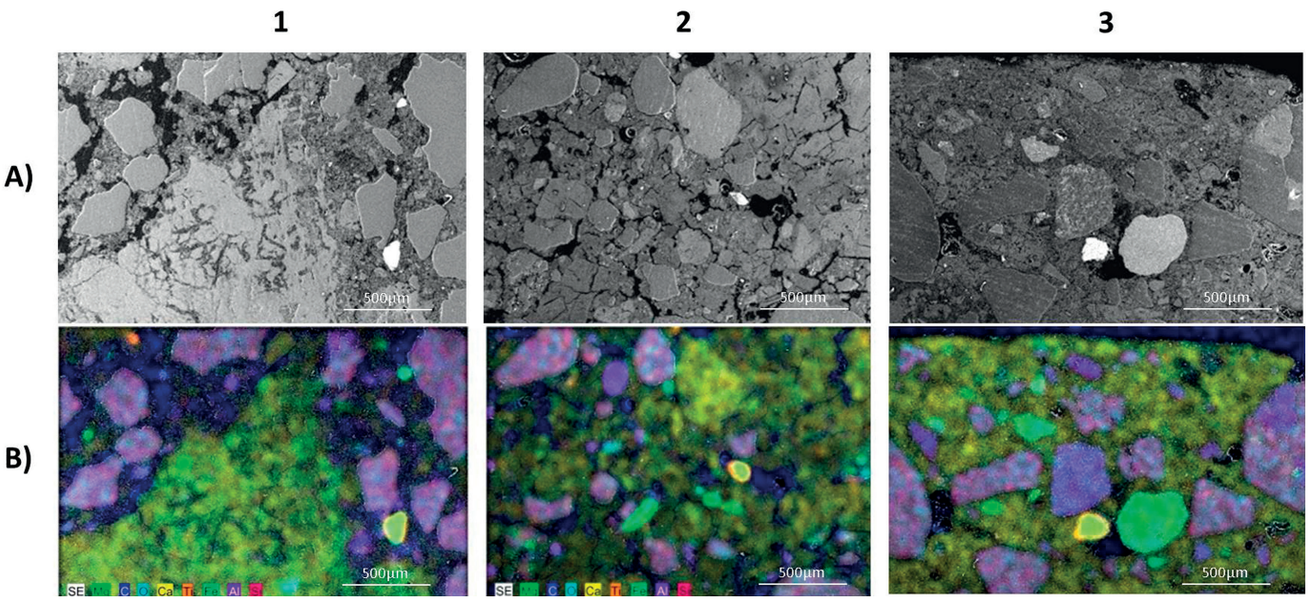

Figure 6.7. SEM images (A) of samples from Hosh el-Kab (1), Dangeil (2) and Soba (3) combined with EDS elemental distribution maps (B) where **Mg**, **C**, **O**, **Ca**, **Ti**, **Fe**, **Al** and **Si** are depicted together

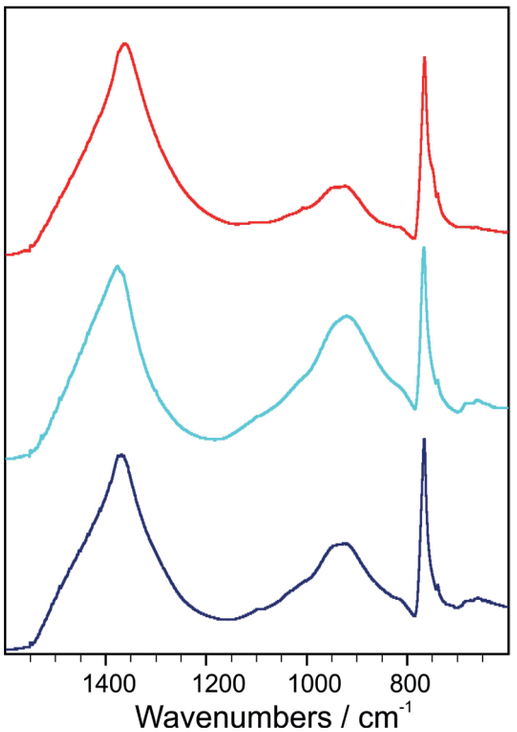

Figure 6.8. Comparison of IR spectra of a sample from Hosh el-Kab (red line), Soba (blue line) and Dangeil (dark blue line)

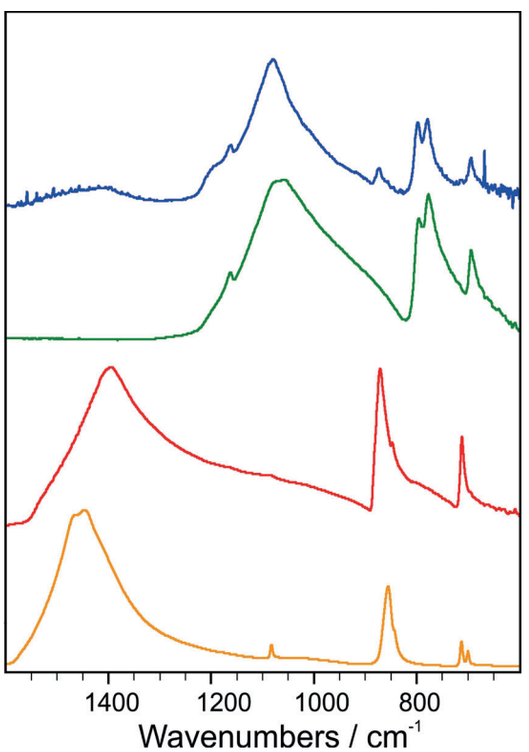

Figure 6.9. Comparison of IR spectrum of a sample from Hosh el-Kab (blue line) and reference spectra of calcite (red line), aragonite (yellow line) and quartz (green line) samples

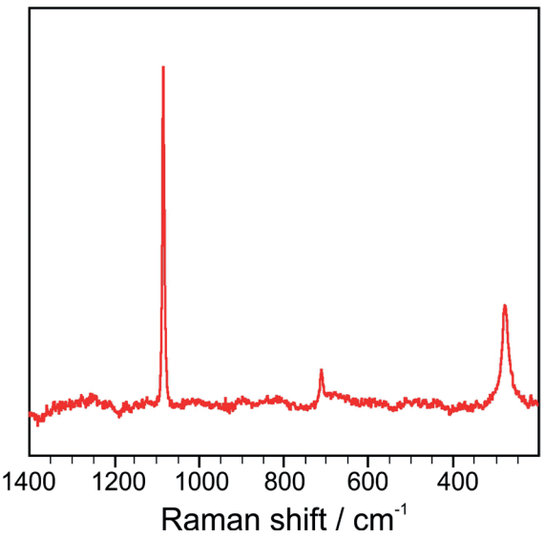

Figure 6.10. An exemplary Raman spectrum from a sample from Hosh el-Kab

rich areas). The co-presence of Mg together with Ca and C rich areas might indicate a dolomitic character of the lime plaster ($CaCO_3$, $MgCO_3$). EDS offers a higher sensitivity for light elements if compared to XRF, allowing for the detection of Mg in the investigated samples.

The plaster physic-chemical structure of the Hosh el-Kab sample, according to SEM-EDS observations, was similar to that of the Dangeil and Soba samples (**Figure 6.7**).

The conclusions based on elemental composition analysis were confirmed by FTIR, Raman and XRD measurements. The presence of a strong broad band at ~1400, and strong sharp bands at 870 and 712cm^{-1} in the FTIR spectra of Dangeil, Soba and Hosh el-Kab plasters (**Figures 6.8 and 6.9**) should be attributed to inorganic carbonate minerals. The positions of these bands are typical for calcite ($CaCO_3$), which was also identified through the use of Raman spectroscopy (**Figure 6.10**) and XRD (**Figure 6.11**). The shift of the maximum of $\nu_{\text{asym C-O}}$ towards higher wave numbers, and the split of the $\gamma_{\text{C-O}}$ in spectra of all samples, indicates the presence of an admixture of another form of $CaCO_3$, i.e. aragonite. XRD measurements revealed the presence of quartz (SiO_2) in every sample. This observation was confirmed in the case of the Hosh el-Kab plaster IR spectroscopic measurements. The most intense bands at 1058, 796 and 777cm^{-1} in the spectrum of this sample (Figure 6.9) originate from $\nu_{\text{asym Si-O}}$ and $\gamma_{\text{Si-O}}$ vibrations of polycrystalline quartz (sand). Less intense bands peaking at ~1010 and 777cm^{-1} on FTIR spectra of samples from Dangeil and Soba (Figures 6.8 and

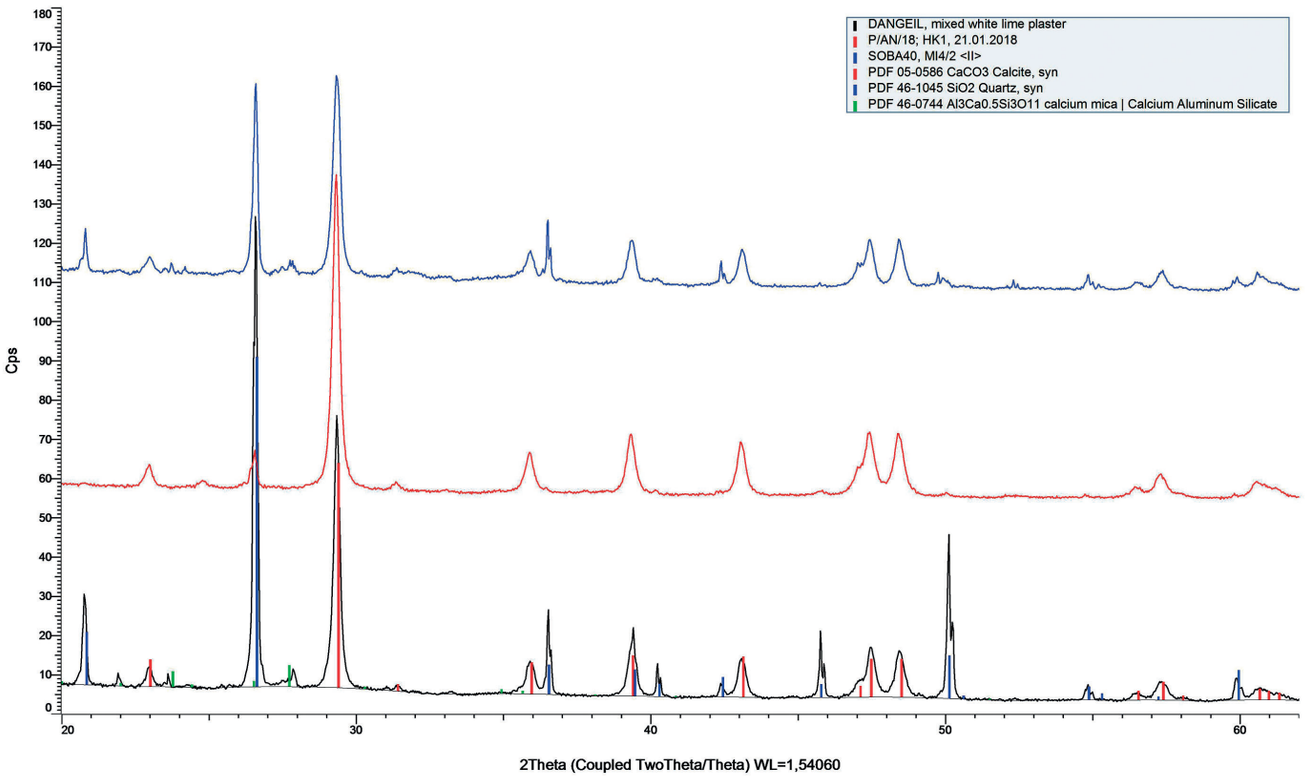

Figure 6.11. Comparison of X-ray diffractograms registered for samples from Soba (blue line), Hosh el-Kab (red line) and Dangeil (black line). Vertical lines indicate characteristic 2theta values for quartz (blue line), calcite (red line) and calcium alumina silicate (green line)

6.9) are attributed to the $\nu_{\text{asym Si-O}}$ and $\gamma_{\text{Si-O}}$ vibrations of clay minerals. XRD results indicate calcium alumina silicates ($Al_3Ca_{0.5}Si_3O_{11}$) (Figure 6.11). The intensity of the peaks attributed to quartz was clearly lower in the IR spectra of the sample from the Hosh el-Kab plaster, which is consistent with the XRD results, and points to the lower sand content in the Hosh el-Kab plaster in comparison with samples from Dangeil and Soba. The spectrum of the Hosh el-Kab plaster shown in Figure 6.9 was obtained from the surface of the untreated sample (?) pressed to the ATR crystal. The high intensity of the silicate attributed bands in this spectrum could be a consequence of the contamination of the surface with mud or sand.

Interpretation in a historical context

The sample from Hosh el-Kab comes from a context that has been dated to the 7th century. It is a time linked with the early period of existence of the Kingdom of Alwa in this region. The comparative sample from Soba comes from the same kingdom, although is of a later period, dated to the 9th–11th century (Welsby 1998, 272).

Both samples show a quite high similarity in structure, based on macroscopic and microscopic observations. Numerous inclusions of bigger particles of sand are characteristic, although only the plaster from Hosh el-Kab was finished with a layer of whitewash. Building E at Soba, from where the Soba sample originates, has been identified as a church (Welsby 1998, 29–34), a significant public building. The technological similarity, as well as the lime whitewash, could suggest that the building in the Hosh el-Kab fort was also of special value.

The sample from Dangeil was collected from the remains of the kiosk in front of the Amun temple dated to the 1st century AD, thus from the time of the Meroitic kingdom (Anderson and Mohammed Ahmed 2008, 40), showing previous building traditions in the region and use of plasters based on lime and gypsum binder (Letourneux and Fenuille 2008).

Despite the different historical contexts, all three samples showed similarity in terms of the chemical

composition of the plaster, being a mixture of calcite, aragonite, sand and clay minerals. Slight discrepancies were observed for the Hosh el-Kab sample: (i) as characterised by a lower content of sand compared to plaster fragments from Dangeil and Soba, and (ii) being the only one where barium was determined. This latter fact might be explained by the presence of whitewash, where the element was identified. In comparative material samples from Dangeil and Soba, a whitewash layer was not preserved. Using a different type of calcium for plaster and for whitewash, is also indicatative of the high quality of the workshop at Hosh el-Kab.

CHAPTER 7

RADIOCARBON DATING

Mariusz DRZEWIECKI

Samples selected for analysis

During the fieldwork, charcoal samples were taken from all recorded hearths and concentrations of burnt materials. In addition, other types of organic materials suitable for radiocarbon analysis, such as seeds, bones and wood were collected.

At the end of the excavations, the inventory listed 48 samples in total. There were 14 samples from Hosh el-Kab (**Table 7.1**), collected from all three trenches and various contexts. From this site, five samples were chosen for analysis; four from the lowest layers in each of the trenches (P/HK1/7-9, 12) and the fifth (P/HK1/13), from the upper layer in Area 3A, which was chosen to provide dating for the secondary use of the fort.

From Abu Nafisa, altogether seven samples were listed (**Table 7.2**), five consisting of charcoal, and two of organic materials covered in mud that had been exposed to extensive heat. Due to the poor state of preservation of the fort, there were fewer samples than from Hosh el-Kab; however, all samples from Area 2, layer 7, came from occupation predating the construction of the fort. Under these circumstances, there was a possibility to obtain a *terminus post quem* and *terminus ante quem* for the construction of the enclosure. It was crucial to analyse samples from the context of the fort foundations, and from the context of occupation predating the defences. Altogether five samples were sent to the Poznań Radiocarbon Laboratory (P/AN/15, 17, 19, 20, 22).

During excavations in Umm Marrahi, 27 samples were collected (**Table 7.3**). In both trenches, layers 1 to 3 contained mixed pottery materials, thus only two samples were taken from these contexts. Layers 4 to 6 yielded a large amount of homogenous ceramic material and samples from those layers were the focus of laboratory analysis. From each trench, samples from layers 4, 5 and 6 were selected. In total, 12 samples from Umm Marrahi were sent for radiocarbon analysis.

INV. NO	*DATE SAMPLED*	*AREA*	*LAYER*	*PART*	*TYPE OF MATERIAL*
P/HK1/1	2018-01-13	2	2	inner passage	charcoal
P/HK1/2	2018-01-13	3	2	NW part of the trench	charcoal
P/HK1/3	2018-01-13	3	1		charcoal
P/HK1/4	2018-01-14	3	3	next to the mud bricks	charcoal
P/HK1/5	2018-01-14	3	3	Fireplace	charcoal
P/HK1/6	2018-01-15	3	4	E part of the trench	charcoal
P/HK1/7	**2018-01-15**	**3**	**4**	**E part of the trench**	**charcoal**
P/HK1/8	**2018-01-17**	**1**	**4**	**N from the wall**	**charcoal**
P/HK1/9	**2018-01-16**	**2**	**4**	**from S profile of the trench**	**remains of wood**
P/HK1/10	2018-01-17	2A	4	S part	charcoal
P/HK1/11	2018-01-17	1	from the wall	core of the N curtain wall	mud mortar
P/HK1/12	**2018-01-18**	**2**	**directly under the foundation of the L-shaped wall**	**the gate**	**bone fragment**
P/HK1/13	**2018-01-18**	**3A**	**2**		**seeds**
P/HK1/14	2018-01-18	1	1	in the middle of the trench	charcoal

Table 7.1. List of samples collected during excavations at Hosh el-Kab. Bold font indicates samples sent for radiocarbon analysis (prepared by Aneta Cedro and Mariusz Drzewiecki)

INV. NO	*DATE SAMPLED*	*AREA*	*LAYER*	*PART*	*TYPE OF MATERIAL*
P/AN/15	2018-01-20	1	1		**charcoal**
P/AN/16	2018-01-22	2	5	SE corner of the trench	charcoal
P/AN/17	**2018-01-22**	**2**	**4**	**NE part of the trench, on top of alluvial layer**	**charcoal**
P/AN/19	**2018-01-23**	**2**	**7**	**S part of the trench**	**charcoal**
P/AN/20	**2018-01-23**	**2**	**7**	**S part of the trench**	**charcoal**
P/AN/21	2018-01-23	2	7	S part of the trench	burned mud with organic remains
P/AN/22	**2018-01-23**	**2**	**7**	**S part of the trench**	**burned mud with organic remains**

Table 7.2. Samples collected during excavations at Abu Nafisa. Bold font indicates samples sent for radiocarbon analysis (prepared by Aneta Cedro and Mariusz Drzewiecki)

INV. NO	*DATE SAMPLED*	*AREA*	*LAYER*	*PART*	*TYPE OF MATERIAL*
P/UM/23	2018-11-15	1	1	near SE corner	charcoal
P/UM/24	2018-11-17	1	1	1m to N and 2m to W from the walls in the SE corner	charcoal
P/UM/25	2018-11-17	1	2	S part	charcoal
P/UM/26	2018-11-17	1	2	central part	charcoal
P/UM/27	**2018-11-20**	**1A**	**2**	**part N, by wall E**	**charcoal**
P/UM/28	2018-11-20	1A	2	part SW of the trench	charcoal
P/UM/29	2018-11-20	3A	2		charcoal
P/UM/30	2018-11-20	3A	2		charcoal
P/UM/31	**2018-11-21**	**1A**	**3**	**next to wall E**	**charcoal**
P/UM/32	2018-11-21	1A	3	part W of the trench	fragment of wood
P/UM/33	**2019-11-24**	**1A**	**4**		**charcoal**
P/UM/34	2019-11-24	1A	3	part W of the trench	fragment of wood
P/UM/35	2019-11-24	1A	1	part NW	fragment of wood
P/UM/36	**2018-11-25**	**1A**	**5**		**charcoal**
P/UM/37	2018-11-24	1A	4	part S	charcoal
P/UM/38	2018-11-26	3B	5	part E	charcoal
P/UM/39	2018-11-26	3B	5	corner SE	charcoal
P/UM/40	**2018-11-26**	**3B**	**4**	**next to wall**	**charcoal**
P/UM/41	**2018-11-28**	**3B**	**5 (upper layer of burning)**	**N profile of the trench**	ash
P/UM/42	2018-11-28	3B	5 (lower layer of burning)	N profile of the trench	charcoal
P/UM/43	2018-11-27	1A	5		charcoal
P/UM/45	2018-11-27	3B	5	fireplace	charcoal
P/UM/46	2018-11-27	1A	6	part NE	charcoal
P/UM/47	2018-11-27	3B	6		**charcoal**
P/UM/48	2018-11-27	3B	6	fireplace	seeds
P/UM/49	**2018-11-27**	**3B**	**5**	**corner SW**	**charcoal**
P/UM/50	2018-12-01	3A	3	corner NW	charcoal

Table 7.3. Samples obtained during excavations at Umm Marrahi. Bold font indicates samples sent for radiocarbon analysis (prepared by Aneta Cedro and Mariusz Drzewiecki)

Inv no of the sample	Laboratory no	^{14}C date	Comments	Calibration	
				68.2% probability	95.4% probability
P/HK1/8	Poz-102873	1525 ± 30 BP		434AD (10.8%) 453AD 470AD (11.0%) 487AD 534AD (46.4%) 585AD	428AD (35.1%) 499AD 504AD (60.3%) 604AD
P/HK1/12	Poz-0	>0 BP	1.0%N 2.8%C no collagen		
P/HK1/9	Poz-102982	1370 ± 130 BP	0.04mgC	539AD (63.7%) 778AD 792AD (1.9%) 804AD 842AD (2.6%) 860AD	410AD (92.9%) 902AD 920AD (2.5%) 963AD
P/HK1/7	Poz-102875	1435 ± 30 BP		604AD (68.2%) 646AD	571AD (95.4%) 655AD
P/HK1/13	Poz-102876	130 ± 30 BP	Date may extend out of range	1682AD (12.6%) 1707AD 1719AD (9.0%) 1737AD 1804AD (7.9%) 1820AD 1833AD (27.2%) 1883AD 1914AD (11.5%) 1936AD	1675AD (38.0%) 1778AD 1799AD (42.4%) 1894AD 1905AD (14.9%) 1942AD
P/AN/15	Poz-103033	1510 ± 30 BP		536AD (68.2%) 604AD	430AD (19.7%) 494AD 511AD (0.9%) 517AD 529AD (74.8%) 622AD
P/AN/20	Poz-102877	1450 ± 30 BP		592AD (68.2%) 643AD	561AD (95.4%) 651AD
P/AN/22	Poz-103029	3120 ± 70 BP	0.14mgC	1490 BC (1.7%) 1485 BC 1451 BC (66.5%) 1288 BC	1596 BC (0.3%) 1589 BC 1532 BC (94.7%) 1207 BC 1202 BC (0.2%) 1196 BC 1139 BC (0.2%) 1135 BC

Table 7.4. Results of the radiocarbon analysis of the first set of samples (Poznań Radiocarbon Laboratory)

Results

All samples were analysed in the Poznań Radiocarbon Laboratory, which is equipped with two spectrometers, the 1.5 SDH-Pelletron Model 'Compact Carbon AMS' produced by the National Electrostatics Corporation, Middleton, USA. The precision was set as 'normal' meaning that from an individual sample a single cathode was prepared for ^{14}C AMS measurement.

The first set of samples was sent after the end of the first fieldwork season in February 2018 (order no 13596/18). It contained five samples from Hosh el-Kab and three from Abu Nafisa.

There are three issues that need to be presented together with the results (**Table 7.4**). As it turned out, sample P/HK1/12, which was a fragment of a bone found under the foundation of the L-shaped wall in the gate, was not suitable for the analysis as it lacked collagen.

In the case of sample P/AN/22, the results provided suggest that the material was much older than sample P/AN/20, which was collected from the same context. In this situation, an additional enquiry was made with the head of the laboratory. It turned out that the organic material was insufficient for the analysis, thus a larger piece of the sample including the surrounding heat-exposed mud was analysed. The resulting date is an average of both, the organic remains embedded in the mud and organics within the mud (**Figure 7.1**), thus, the result cannot be used in our research.

Figure 7.1. Sample P/AN/22, consolidated by extensive heat, wood remains sunk in mud (photo Poznań Radiocarbon Laboratory)

Inv no of the sample	Laboratory no	14C date	Comments	Calibration	
				68.2% probability	95.4% probability
P/UM/27	Poz-111697	195 ± 30 BP	Date may extend out of range	1662AD (15.4%) 1681AD 1739AD (7.0%) 1750AD 1763AD (31.0%) 1802AD 1938AD (14.9%) ...	1648AD (23.1%) 1691AD 1728AD (52.3%) 1810AD 1925AD (20.0%) ...
P/UM/36	Poz-111698	1475 ± 30 BP		560AD (68.2%) 620AD	542AD (95.4%) 645AD
P/UM/33	Poz-111692	1410 ± 30 BP		615AD (68.2%) 655AD	590AD (95.4%) 665AD
P/UM/31	Poz-111699	205 ± 30 BP	Date may extend out of range	1654AD (21.3%) 1679AD 1764AD (32.5%) 1801AD 1939AD (14.5%) ...	1646AD (26.9%) 1686AD 1731AD (50.1%) 1809AD 1927AD (18.5%) ...
P/UM/43	Poz-111700	1525 ± 30 BP		434AD (10.8%) 453AD 470AD (11.0%) 487AD 534AD (46.4%) 585AD	428AD (35.1%) 499AD 504AD (60.3%) 604AD
P/UM/46	Poz-111693	1495 ± 30 BP		545AD (68.2%) 603AD	435AD (2.7%) 452AD 471AD (3.1%) 487AD 534AD (89.6%) 641AD
P/UM/41	Poz-0		0.4%C		
P/UM/42	Poz-111702	1510 ± 30 BP		536AD (68.2%) 604AD	430AD (19.7%) 494AD 511AD (0.9%) 517AD 529AD (74.8%) 622AD
P/UM/47	Poz-111703	1485 ± 30 BP		551AD (68.2%) 610AD	474AD (1.2%) 485AD 536AD (94.2%) 646AD
P/UM/45	Poz-111704	1485 ± 30 BP		551AD (68.2%) 610AD	474AD (1.2%) 485AD 536AD (94.2%) 646AD
P/UM/49	Poz-111712	1480 ± 30 BP		556AD (68.2%) 615AD	538AD (95.4%) 645AD
P/UM/40	Poz-111713	1500 ± 30 BP		543AD (68.2%) 602AD	432AD (10.6%) 489AD 532AD (84.8%) 639AD
P/AN/17	Poz-111714	1550 ± 30 BP		430AD (50.0%) 493AD 513AD (2.5%) 517AD 529AD (15.7%) 550AD	423AD (95.4%) 574AD
P/AN/19	Poz-111716	1480 ± 30 BP		556AD (68.2%) 615AD	538AD (95.4%) 645AD

Table 7.5. Results of the radiocarbon analysis of the second set of samples (Poznań Radiocarbon Laboratory)

Sample P/HK1/9, after processing, contained only 0.04mg of carbon. Despite the small amount of carbon, the result was consistent and is comparable to other samples from similar contexts.

The laboratory provided calibration of the dates (see Table 7.4) using OxCal v4.2.3 software, based on Bronk Ramsey (2013); r:5 and IntCal13 atmospheric curve (Reimer *et al*. 2013).

The larger set was assembled after the second season of excavations, at the beginning of January 2019 (order no 14795/19). It contained 12 samples from Umm Marrahi and two samples from Abu Nafisa.

^{14}C dates were obtained for 13 samples (**Table 7.5**). Two issues need to be presented to understand the results. The chronology of the previous set of samples for Abu Nafisa left some uncertainty, thus two additional samples were sent with the second set. The dates fit well with earlier results.

There was another difficulty, concerning sample P/UM/41. The sample was collected from the northern profile of trench Area 3B where a layer of ash was identified. Unfortunately, under laboratory conditions, the ash turned out to contain a low level of carbon and there was a threat that the result might be not precise, thus a decision was made not to use this sample.

Again the laboratory provided calibration of the dates (see Table 7.5) using OxCal v4.2.3 software based on Bronk Ramsey (2013); r:5 and IntCal13 atmospheric curve (Reimer *et al*. 2013).

Summation

Twenty absolute dates were obtained. Each was derived from a different sample, collected from different trenches and layers. The largest set, comprising 11 dates, comes from Umm Marrahi. In the hilltop fort, samples

from the lowest layers (layer 6) in both trenches provided similar dates, AD 536–646 (with 94.2% probability) and AD 534–641 (with 89.6% probability), thus, it is highly possible that the first occupation of the fort started between AD 536 and 641. It constitutes a *terminus ante quem* for the construction of the enclosure wall.

Absolute dates from layers 5 and 4 were similar. Some indicated occupation in the latter part of the period. The most extreme example was the date from Area 1A, layer 4, which almost exclusively fit into the latter part of the time span (AD 590–665, 95.4% probability), thus, the fort was in use until the first half of the 7th century. Results of radiocarbon analysis for samples collected in layers 3 and 2 gave more recent dates, with a wide range, stretching between the 17th and 20th centuries (**Figure 7.2**).

Based purely on absolute dating, the Umm Marrahi fort had two phases. The first started between AD 536 and 641 and lasted for a relatively short time, until the half of the 7th century. The second occupation was in the Funj/modern period.

The results of absolute dating for Hosh el-Kab are comparable (**Figure 7.3**). Three samples taken from the lowest levels, associated with the first phase of occupation, provided the following dates: AD 428–604 (with 95.4% probability), AD 571–655 (with 95.4% probability) and AD 410–902 (with 92.9% probability).

The last sample had a much wider date range than those previous. It was the only one that was not obtained from a charcoal sample, but from a heavily eroded fragment of wood. The three dates overlap between AD 571 and 604; however, the first two samples indicated that the entire 6th century and even the 5th century should also be taken into consideration.

A fourth sample, collected from a later layer at Hosh el-Kab, gave a date fitting within the Funj/modern period. Thus, the first phase of the occupation in the fort possibly started in the 6th century. The enclosure was in use until the 7th century. The second phase is much more recent and can be dated between the 17th–20th centuries.

The situation at Abu Nafisa was different because an occupation layer preceding the construction of the fort was identified in Area 2 (**Figure 7.4**). At the same time, the architectural remains of the enclosure were heavily eroded, so no stratigraphic sequence within the fort has

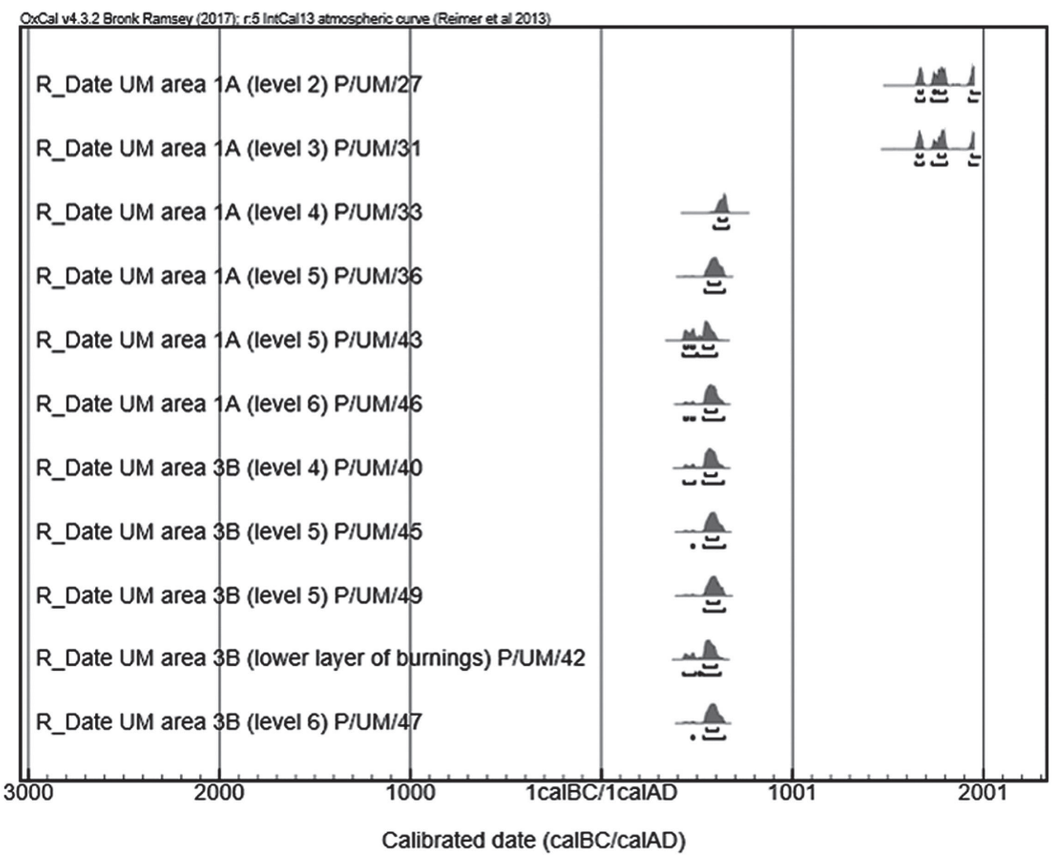

Figure 7.2. Radiocarbon dates of samples from Umm Marrahi (prepared by Mariusz Drzewiecki)

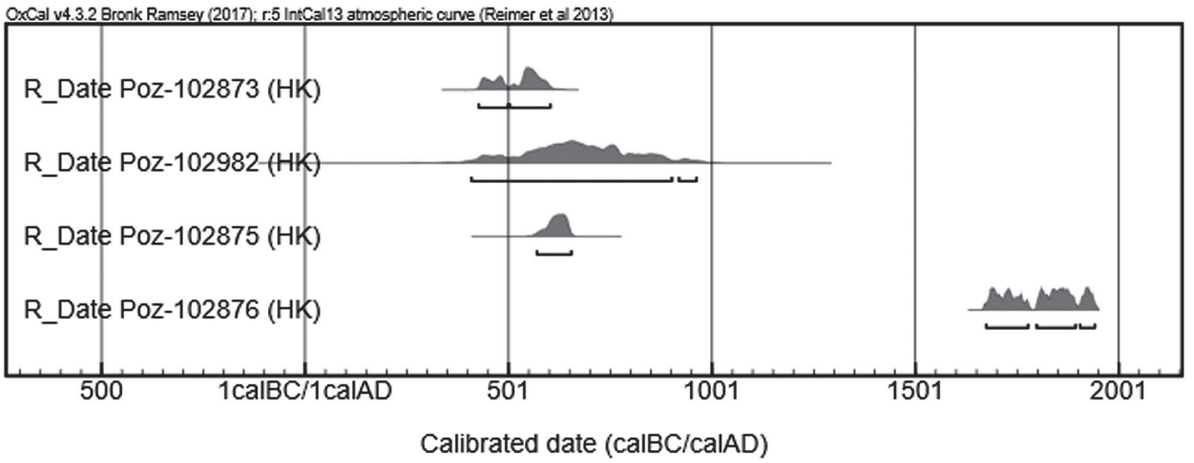

Figure 7.3. Radiocarbon dates of samples from Hosh el-Kab (prepared by Mariusz Drzewiecki)

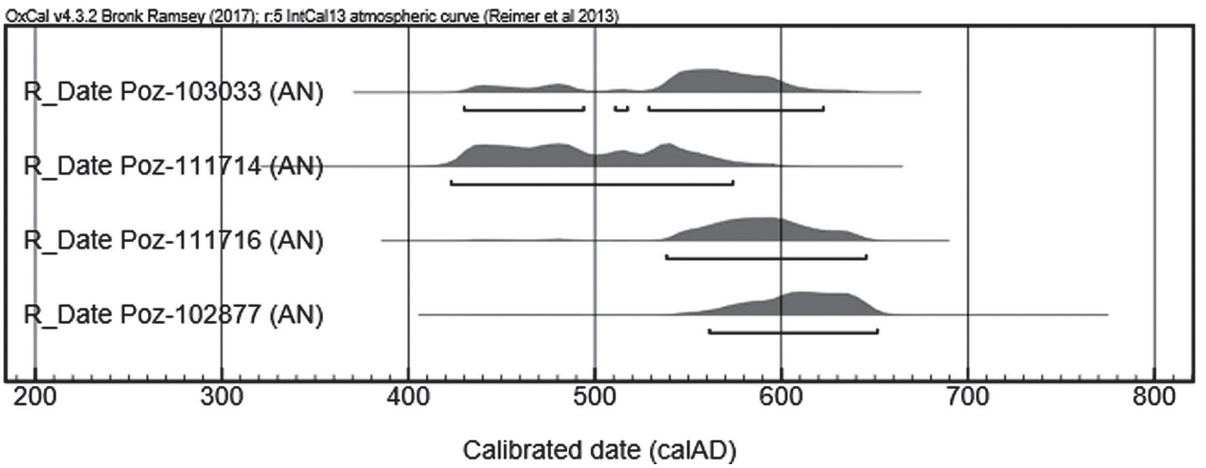

Figure 7.4. Radiocarbon dates of samples from Abu Nafisa (prepared by Mariusz Drzewiecki)

survived. The absolute dates from the layer below the foundations were AD 538–645 and AD 561–651 (both with 95.4% probability), while the samples from the lowest layers in the fort provided dates of AD 423–574 (with 95.4% probability) and AD 529–622 (with 74.8% probability). All the dates overlap between AD 561–574, making this 13-year period the most probable for the construction of the fort. No secondary settlement was noted in the absolute dating from Abu Nafisa, however, we did not collect samples from contexts associated with the grave of the sheikh located in the south-east corner of the enclosure.

CHAPTER 8

SYNTHESIS

Mariusz DRZEWIECKI

Typology of the fortified sites

There are at least 36 fortified sites in Upper Nubia that can be dated to the period of Late Antiquity (2nd–7th century AD). The epoch witnessed a turn toward defensive architecture on a scale that had never before been seen in the region. The written sources describing Upper Nubia at that time, however, focus on political changes presenting an image of a weak Meroitic Empire, victorious Aezana military raids and rebellious Nubians fighting for control over the Middle Nile region. None of the texts provides information about the defensive architecture.

Each of the 36 fortified sites is different but general patterns in the architecture can be identified. The subject was the focus of a PhD thesis (Drzewiecki 2016a), where the group was divided into four types (see Chapter 1 for details). Type One are irregular enclosures built between the Third and the Fifth Cataract Region during the early medieval period. Type Two are highly regular forts, some with vertical masonry, erected between the Fourth Cataract and the confluence of the Blue Nile and the White Nile. Their chronology is still an open question and researchers have variously suggested Meroitic, Post-Meroitic and Early Christian dating for them. Type Three is a combination of the previous two kinds, and these forts are dated to the Early Christian period. These consist of quadrilateral enclosures with an irregular distribution of bastions or towers and gates. Type Four are regular defences with casemate walls. They were built away from the Nile Valley and are the oldest within the entire assemblage, originating in the late Meroitic period.

Due to their chronology and geographical location, Type One and Three structures were most probably built by the Makurian state. Type Four forts facilitated traffic and trade throughout the Bayuda in the late Meroitic period. The Type Two enclosures are the most enigmatic. Their geographic distribution spans *c*. 550km of the Nile Valley, overlapping the central territories of the Meroitic State and later, the borders of the Kingdoms of Makuria and Alwa. They resemble small late Roman forts built in the Egyptian Eastern Desert.

Derek Welsby has suggested that selected defences upriver from Mograt Island were built by the Alwan kings. He pointed out that the northernmost Alwan fort could have been located at Kurgus. This raises questions about the forts at El-Ar, Mikeisir and the recently discovered El-Qinifab, which are beyond the limit proposed by Welsby. On the other hand, due to the wide chronological time span of some of the enclosures (e.g. Umm Marrahi, Nakhara), there is the possibility that at least some of these sites might be earlier in date than the foundation of Alwa.

Enigmatic forts

If the forts were built by the southernmost Nubian kings, then why was only the northern part of Alwa provided with fortifications, while the capital at Soba and other regions of the realm were not? The issue of the original purpose of the forts, or, in other words, the idea behind the construction of the defences has to be raised. How do we explain the distances between neighbouring forts? In some cases, they are located at a distance of less than a few kilometres apart, while others are separated by more than 100km. Was it actually a chain of forts? Such an irregular distribution might indicate that they did not constitute a group of sites responsible for protection of the entire 550km section of the Nile Valley. What was their purpose then? What were the circumstances behind the decision to build the defences? All these issues can be collected into the two main research questions: who built the forts and why (see Chapter 1). These two questions constitute the main axis of the research presented in this monograph.

There are three issues that require consideration in formulating the answer to these questions (for details see Chapter 1). The first is to establish the identity of the authorities that may have been responsible for the construction of the forts. These might have been the late Meroitic administrators, since the forts cover the central area of their realm. On the other hand, it might also be the Makurian or Alwan authorities. The Makurian

administrators are considered here as being responsible for the construction of Type One and Type Three fortified sites, however, the forts stretch deep into the heartland of Alwa. The southernmost at Jebel Umm Marrahi is just 50km from Soba, and as Welsby suggests, they could be of Alwan origin. A third solution could be that the Meroitic authorities built some forts, which later were included in the Makurian and/or Alwan domains.

These considerations bring us closer to the second major issue, the chronology of the forts. The time at which the defences were built needs to be narrowed down. To do this, a careful consideration of contexts and small finds should be introduced. Only materials and samples from the lowest layers within the forts, as well as from the layers below the foundations of the enclosures, should be taken into consideration. They can provide *terminus ante quem* and *terminus post quem* dates for the construction of the forts. Additional dateable materials can be obtained from the cores of the curtain walls and the surface surveys. However, these need to be interpreted with caution, keeping in mind changes and distortions connected with deposition and post-deposition processes, as well as possible architectural modifications carried out in subsequent years and centuries.

Stratigraphic considerations should also inform the third issue, which focuses on the daily life and activities of the founders. Organic materials and small finds from the layers associated with the beginnings of the forts should be analysed. Pottery sherds and organic remains can provide information about the character of the settlement. The results can shed some light on the issue of luxury goods available for the residents and the variation in the types of vessels in use. Consumption remnants, especially faunal remains, can be markers for the presence of elites (see Chapter 5 for details).

Architectural remains associated with the first settlement phase in the forts, if identified, can provide information on the daily life and organisation of space. Were there barracks and large storage buildings, indicating the presence of a garrison, or was the enclosed space covered with an irregular composition of houses and passageways, similar to early medieval fortified settlements in Lower Nubia? How long were the forts inhabited in the first phase? Was it a brief period when perceived threats forced people to hide behind the walls, or had they been settled for at least a few generations? With answers to these questions, the purpose of the forts will be both clearer and more understandable.

The three forts

In an ideal world, all of the forts would be investigated. This includes nine sites that have been identified as Type Two enclosures, as well as an additional four defensive structures that potentially belong to the same group. However, some of the forts are located on research concessions belonging to other institutions. In addition, the Fifth Cataract region was closed to foreign researchers for years following the 2012 announcement of the construction of a hydropower station at Shereik. The area was endangered by flooding and was at the time divided into new research concessions. In 2013, the first visits of the researchers met with hostility and obstruction from the local committees.

In these circumstances, the best place to obtain new information on the Type Two forts, especially concerning their chronology, was the cluster of the three southernmost sites: Abu Nafisa, Hosh el-Kab and Umm Marrahi. A detailed description of the archaeological surveys, excavations and geophysical prospection is presented in Chapter 2.

The architecture and stratigraphy was investigated on each of the sites (see Chapter 3). At Hosh el-Kab the fort was founded on hard, disassociated alluvial soil. No settlement traces, that could be dated to before the construction of the enclosure, were recorded. In 2018, the defences stood to a maximum of 0.7m in height, and the remains appear to suggest the fort was built in a single stage as a stone, mud mortar bonded, regular, quadrilateral fort. Some limited restoration using mud brick was, however, noted in the desert gate.

Extensive architectural remains were recorded inside the fort. In one area, stone and red brick debris could be seen. These were close to the centre of the fort and much had been destroyed by a modern irrigation channel. Before this occurred, this had been the best preserved feature on the surface of the site. In 2011, it was a concentration of debris 12 × 7m and 0.5m high, bearing traces of modern digging. Based on the presence of red brick and the east-west orientation of its long axis, this might be interpreted as remains of a small church.

In 2018, in the course of the pottery surface survey a few Early Christian sherds were identified in the potential church area. In addition, fragments of lime plaster were recorded among the debris. One sample was collected and brought to Poland where it was compared to lime plaster from Dangeil (the kiosk in front of the Amun temple) and Soba (Building E, identified as a church). The sample from Hosh el-Kab was a

fragment of a high quality interior decoration. Different kinds of calcium for plaster and for whitewash in the Hosh el-Kab sample indicate a high level of craftsmanship (for details, see Chapter 6). These observations make the assumption that the remains are that of a church more plausible.

The enclosed space also housed other buildings. Along the northern and southern curtain walls, long rows of mud brick units were recorded. In addition, fragments of a free standing mud brick building were identified using magnetometry. In Area 3, abutting the western curtain wall, a mud brick structure was uncovered. The structure had at least two construction phases.

It seems that Hosh el-Kab was extensively used, and most of the area inside the fort was overbuilt with regular units along the walls, and various regular free standing buildings. After this intensive settlement phase, the site was abandoned. It was partly re-occupied after the curtain wall fell into ruin, suggesting that the settlement hiatus may have lasted for a few centuries.

Pottery from the site (Chapter 4) indicated that the lowest layers inside the fort, the first phase of settlement, can be associated with the Post-Meroitic/Transitional Christian ceramic traditions. Early Christian pottery was also recorded on the surface in the area of the remains of the potential church. The pottery assemblage, however, was dominated by Funj/modern period sherds. Radiocarbon dating (Chapter 7) fits well into the results of pottery investigation, suggesting that the beginning of the first phase should be dated between AD 571 and 604. Secondary settlement falls into a much later period, between the 17th and 20th centuries.

The Abu Nafisa fort, like Hosh el-Kab, was founded on alluvial soil, although the ground there retained a higher level of moisture. Below the foundations of the curtain walls, remains of an earlier settlement were found. The remnants of a circular fire place, reinforced with stone, were recorded in Area 2. The fort itself was badly eroded, but some traces of renovation were identified in the south-west corner bastion. All standing defensive architectural remains were built using vertical masonry. This is the only example of this construction technique this far south. Other forts where vertical masonry has been recorded are to the north of Meroe (Nakhara, Gandeisi, Mikeisir, El-Ar, El-Qinifab).

It seems that the fort suffered from floods. The magnetic map showed substantial volumes of alluvial soil both inside and outside the fort. The number of small finds from the site is relatively low. In our trenches no architecture apart from defensive structures were recorded, however, inside the fort, there were 13 concentrations of stone, which might be traces of buildings and structures. Their chronology is not set, but based on their state of preservation, they appear older than the remains of the latest phase of settlement, which is associated with the person of Sheikh Abu Nafisa.

Post-Meroitic/transitional Christian pottery was identified in layers below the foundations of the fort as well as in strata associated with lowest remains of the curtain walls. No Early Christian pottery was noticed. The few faience beads from the layers associated with the foundation phase of the fort can be dated to the Post-Meroitic period (for details see Appendix 1). The beads from the surface and topsoil layers were a mixture; a single glass bead recorded in layer 1 is a Fatimid period production, while the stone beads were made in the 19th/20th century. The charcoal samples from the lowest layers indicate that the Abu Nafisa fort was built sometime between AD 561–574, which would make it a few years older than Hosh el-Kab.

Umm Marrahi is the best preserved of these forts. The remains of an early Holocene settlement were discovered in the bedrock cracks at the lowest level in trench Area 3B. The curtain walls were built on the cleared rocky surface of the hill, using stone and mud brick, all bonded with mud mortar. It seems that the fort was intensively used in its first phase. It became a focus of settlement again during modern conflicts (in the 19th and the 20th century). Since that time, and up until today, it has been used as a place of worship. The most recent activities, in combination with intensive erosion, led to the destruction of the original spatial organisation of architecture inside the fort, however, a large number of small finds from the lowest layers (4–6) suggests substantial and intensive activity.

Ceramic sherds from these contexts constitute a homogenous group that can be attributed to the Post-Meroitic/transitional Christian tradition of pottery making. The fort, similar to Hosh el-Kab, was still in use during the Early Christian period. The radiocarbon chronology confirms this, providing dates for the beginning of the settlement between AD 536 and 641. The fort was in use until the first half of the 7th century.

During the archaeological surveys in all three forts and directly outside the enclosure walls, no examples of Meroitic pottery were found. In the case of Umm Marrahi, the early Holocene material should not be associated with defensive architecture, but rather with a previous settlement, which was concentrated in the south and central part of the hill plateau.

Who built the forts and who lived there?

With no pottery material indicating Meroitic traditions and with absolute dates suggesting the 6th century for the beginning of the first phase of settlement inside all three forts, one of the main research questions can be answered here. The forts were built by the rulers of the medieval kingdoms.

The pottery from the lowest layers in all three forts was made in the early medieval traditions, similar to the materials found at Soba, the capital of Alwa. The vast majority of vessels were of local production, and only in one case is there a possibility that a vessel originated from the area further to the north beyond the Fifth Cataract region. Since most of the pottery was handmade and was probably made on site or nearby, the forts might have been occupied by people who knew these techniques or were accustomed to using such products from Soba. These observations link the forts and its first inhabitants to the Alwan settlement.

Neither glazed pottery nor imported transportation amphorae were recorded in any of the three forts, and mainly local utilitarian objects were identified. Larger vessels could have been used to serve food, while small bowls could have been used for individual consumption or drinking. Undecorated body sherds of coarse wares, some bearing traces of repair, make up the majority of ceramic finds (in Abu Nafisa, it is 70% of the whole excavated collection, in Hosh el-Kab 78%, and the highest percentage is at Umm Marrahi with 81%). The vessels represented include large bowls (with the rim diameters reaching from 300 to over 500mm) and large storage containers. Finer products were small (100–180mm) and medium (200–300mm) size handmade bowls. They were mostly thin-walled with a black burnished or polished surface. Some had light incised decoration. Painted decoration was scarce and simple, consisting mainly of single strips below the rim. No luxury goods were identified. This observation suggests that the forts were not elite residences.

The study of the animal remains from the three forts brought forth interesting observations in this context. All identified species were mammals and molluscs. In the case of the few cattle remains, the absence of the animal parts that are removed from the carcass in the initial stages of butchering may suggest that these assemblages are ‘table scraps’. The slaughter and initial stages of preparation for consumption may have occurred elsewhere. The shape of the bone fragments, mainly sheep/goat, from the three sites may also indicate how the meat was prepared. It is most likely that the meat was cut on the bone, cooked or roasted.

At Soba and the large early Makurian sites, the ratio of small ruminant remains and cattle is more balanced. At the forts, the presence of sheep/goat is much higher and cattle is significantly lower. The archaeozoological data thus suggests that the consumption model observed in the forts corresponds to that of provincial settlements inhabited by a less wealthy population (for details see Chapter 5).

Bearing in mind the regular architectural units recorded in Hosh el-Kab and the uniform pottery, with no luxury and imported goods present in the lowest layers, it seems probable that each of the forts may have hosted a garrison.

Sequence of the clustered forts

It is surprising that all three forts were built within such a short period of time and in close proximity to each other. In September 2019, a natural event happened that shed some light on the issue. A few months after the fieldwork was finished, Abu Nafisa fort was flooded by the rising waters of the Nile. At the same time, Hosh el-Kab, which was built at a slightly higher level above the river, proved to have been located in a very good spot on the edge of the affected land, and no flood damage to the walls occurred.

It was not the first time that Abu Nafisa had been flooded. Substantial alluvial deposits recorded in the trenches and during the magnetic survey indicate that water had been present on the site before. The flood would also explain why no Early Christian material was found in Abu Nafisa, while Hosh el-Kab provided some examples. After the event, Abu Nafisa may no longer have been considered a suitable place for permanent settlement. The flooding could have occurred between AD 571 and 604, when Abu Nafisa was already standing and Hosh el-Kab was not yet built.

With this in mind, an explaination can be developed as to why the two biggest regular forts are next to each other. Hosh el-Kab is the largest, enclosing 0.78ha, while Abu Nafisa is the second most substantial, providing protection for 0.67ha. Abu Nafisa was built to host a larger garrison. When the flood damaged the fort, the garrison was simply shifted a few hundred metres farther from the river, where they built Hosh el-Kab. It was slightly larger and designed for a more permanent settlement, which continued into the Early Christian period.

Abu Nafisa was built using vertical masonry. The technique was not recorded in Hosh el-Kab. Taking only local conditions into consideration, the first thought that comes to mind to explain this observation is that the damper ground closer to the Nile required different foundations and construction techniques. However, when one looks at the other forts where vertical masonry was used, this theory is not confirmed. The northern (vertical masonry) forts were built on various soils; for example, Nakharu and Mikeisir were founded on the bedrock and Gandeisi on the elevated bank of an island, while El-Ar and El-Qinifab were built in locations similar to that of Abu Nafisa, and probably also suffered from floods.

Observing other forts, another different pattern can be spotted. It is chronological in nature. El-Ar was reinforced in the second (medieval) phase, when its walls were made larger. The modified parts of the El-Ar enclosure were not erected with the vertical masonry technique. In Gandeisi, the oldest sections of the curtain walls were built with vertical masonry, and were subsequently partly overbuilt or extended but without this characteristic arrangement of stone. Thus, it can be suggested that vertical masonry was associated with the oldest forts. The results of radiocarbon dating from Mikeisir fort confirms this observation. Six out of seven samples taken from the fort on Mograt Island gave dates ranging from the 5th century to the first half of the 6th century, suggesting that Mikeisir is older than all three forts in the southern cluster.

Abu Nafisa was built in AD 560s–570s and is older than Hosh el-Kab. The remaining issue, is how to fit Umm Marrahi in the sequence? There is no vertical masonry in the fort on the hill, thus indicating that it is younger than Abu Nafisa. It is hard to imagine that the builders would chose such a spot for the Abu Nafisa fort, if they also had a garrison living and monitoring the surrounding lands from the top of Jebel Umm Marrahi. Staying in the region even for a short period of time, the soldiers would know which of the areas might be endangered by flooding. The location of Abu Nafisa was badly chosen, indicating that its builders did not have time to gain knowledge and experience of local conditions. The mistake was corrected with the construction of Hosh el-Kab. It has been, like Umm Marrahi, erected with understanding of the local topography.

Access to water was more difficult from Umm Marrahi than from the other two forts, but the location was a perfect observation point which enabled the garrison to be warned of approaching enemies. Umm Marrahi is approximately half the size of Hosh el-Kab and could have been built in a shorter time or by a smaller garrison. It might have been built when Abu Nafisa was damaged to quickly provide some security for the region. The second possibility is that it was built a little later when Hosh el-Kab was already in existence, as an observation point, sounding the alarm against fast approaching raiders and providing auxiliary defence for the region. The fort on top of the hill was abandoned at the same time as Hosh el-Kab. It seems that both forts probably lost their significance due to changes of a more general nature, such as a shift in political relations or garrison relocation.

Why were the forts built?

It seems that during the second half of the 6th century, the region was not secure, and that it was a place of strategic importance. This apparently changed during the 7th century when the forts were deserted.

Little is known about the territorial development of early Alwa and the challenges faced by its rulers. A glimpse into the complex situation is provided in accounts made by foreigners describing the conversion of Nubia to Christianity. The second part of the 6th century AD was a time when the Nubian kingdoms were in conflict and were turning toward Byzantium by accepting the Christian faith. The conversion of the three royal courts, at Faras, Dongola and Soba, was not simultaneous and accounts of various plots reached Emperor Justinian and Empress Theodora.

The King of Alwa and his court were baptised in the year AD 580 by the Monophysite Bishop Longinus. The priest was sent by the King of Nobadia as a gesture of goodwill. Part of the royal correspondence between the Nobadian and Alwan rulers is preserved in John of Ephesus' narration (Vantini 1975, 6–26). It indicates that the two kings were forging an alliance against the third kingdom (Makuria), as can be inferred in one of the letters, in which the Alwan ruler wrote:

> 'For he is not thy enemy alone, but also mine: for thy land is my land, and thy people my people. Let not their courage therefore fail, but be manful and take courage: for it is impossible for me to be careless of thee and thy land, especially now that I have become a Christian' (Vantini 1975, 19).

The 6th (and maybe also the 5th) century was a time when the ideas of the Makurian and Alwan royalty about the extent of their respective kingdoms was being

challenged. The conflict may have lasted for decades and the time of Christianisation may have been only one part of it. Acceptance of the Byzantine religion not only provided the means to consolidate the new realms, but also as Christian kings they could count on support from other rulers within the Mediterranean world.

One of the obligations for the Christian kings was to spread the faith among pagans and non-believers. Nobadia and Alwa accepted Christianity through Monophysite Christology while Makuria was converted to the Melkite doctrine. They stood in opposition to each other, and thus a struggle for more land and converts appeared to be justified at that time.

The fortified sites in Upper Nubia, built in the 6th and 7th centuries, may be a tangible remnant of the conflict between the kingdoms. In this context, the forts (Type Two sites) were built by the rulers of Soba. This would explain why the forts can be found only in the northern region of Alwa; this was the area where the conflict with Makuria took place.

Judging on the uneven distribution of the forts, it was probably a fluid situation, with changing odds. From the beginning, the Alwan rulers were able to cover a large section of the Middle Nile Valley, reaching as far as the Fourth Cataract region. The oldest forts, with vertical masonry, are recorded between El-Ar and Nakhara. It is a vast area, but far from Dongola, the capital and seat of the Makurian king. The closest that they got to the Makurian heartlands was approximately 100km. This is the distance between El-Ar fort and the Suegi North and Suegi South double defences, which according to Włodzimierz Godlewski (2005, fig. 1) might constitute the frontier of the early Makurian kingdom (for discussion see Welsby 2002, 135–136).

The fortified sites at Abu Haraz, Redab and El-Kab may have been built by Makuria, gaining them new land in the Fourth Cataract region. At Mograt Island, Ras el-Gezira, El-Karmal and Kuweib were erected, while the fort at Mikeisir was abandoned. El-Ar fort was taken over and remodelled to suit the new authorities and perhaps to serve a new function.

During a situation when Makuria was advancing, the Alwan kings had to start securing their centre of power in the Soba region. Thus, Abu Nafisa was built to control the approach along the Nile, and to stop potential hostiles from landing close to the capital after crossing the Bayuda Desert. Since Soba was not fortified, the fort was the last line of defence.

The strategy introduced by Makuria, to build a chain of fortified sites that could support each other and connect the borderlands with the Makurian heartland, seems to have been the key to success. The Makurians were apparently moving slowly, gaining only a small area of land at a time and then subsequently starting to build defences.

With Makuria advancing and high floods damaging Abu Nafisa, the Alwan kings had to rethink their strategy. The most common approach taken in the Middle Nile region during times of war throughout the centuries, was to fall back and wait until the enemy began to have problems with supplies, transportation, and finally lost contact with the area from which it was deployed. A harsh climate and lack of food were factors which the defenders could count on. The Alwan kings may have retreated from the area between the Fourth and the Fifth Cataracts. They built new forts in which the vertical masonry technique was no longer used. Wad Mukhtar at Sabaloka was to control approaching vessels along the Nile route. Hosh el-Kab may have been the place where the main force was waiting, while Umm Marrahi was conceived to observe the river and the desert, to provide additional protection for the Soba region. At that time, other forts may also have been built (Abu Mereikh C, El-Usheir South, Mutmir and Nadi), however, more detailed information and research on these sites is still needed.

The conflict between the neighbouring kingdoms may have lasted for a long time, since Hosh el-Kab and Umm Marrahi remained in use throughout the Early Christian period. The time range of the absolute dating for the youngest layers in both forts reaches the 7th century AD. The mid-7th century may have seen a change in the relations between the Nubian kingdoms. At that time Makuria faced a new enemy, an Arab army under ʿAbdallāh ibn Saʿd ibn Abī Sarḥ, marching up the Nile. The invading Arab forces went through the Kingdom of Nobadia and reached the capital of Makuria at Dongola. In the narratives of later historiographers, there is no mention of the northern Nubian kingdom. This is interpreted by some scholars as a sign that Nobadia was already at that time a part of Makuria (Edwards 2004, 236–237).

Perhaps the Arab invasion and the diminution of Nobadia created an atmosphere suitable for peace in the south? The Arab invasion was swift, thus the Dongola forces had to be quickly regrouped to answer this new and unexpected threat. The sieges of Dongola left Makuria weakened, and thus probably more open to settle its disputes with Alwa. On the other hand, the kings of Soba had lost their northern ally and might

have been expecting the enemy to focus on preparations for their next military expedition, heading south.

The conflict may have ended in the mid-7th century AD. Its beginnings, however, are difficult to date. During Christianisation it was already in progress so it may be that it started sometime in the 6th or even in the 5th century AD, as the youngest fort known today, at Mikeisir, may have been erected at that time. Many details of the conflict between Makuria and Alwa in the early medieval period are still unclear and others need confirmation. Further studies of the numerous fortified sites in the region will bring new insights into these events.

APPENDIX 1

BEADS FROM THE FORTS

Joanna THEN-OBŁUSKA and Barbara WAGNER

Nine beads, i.e. centrally perforated objects, were collected during the excavations and surveys at three sites, Abu Nafisa (AN), Umm Marrahi (UM), and Hosh el-Kab (HK1) (**Table 9.1**). While some were picked up on the surface, others were collected from loculi dated to the late Post-Meroitic and transitional Christian periods, from the 5th to 7th century AD. The beads, produced by various methods, are made of diverse materials: organic (ostrich eggshell), stone, and man-made materials (faience, glass) and in this order they are presented below. The description of their length and shape follows the classification method by Horace Beck (1928). Additionally, the glass of one bead sample from Abu Nafisa was investigated using laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) providing more details on its provenance and dating through chemical compositional study.

Ostrich eggshell

The Ostrich or Common Ostrich (*Struthio camelus*) is either one of two species of large flightless bird native to Africa. Ostriches inhabit the southern desert areas of Egypt, the Sudan and the savanna south of the Sahara. In the past, there was another species, *Struthio c. syriacus*, the Arabian Ostrich or Middle Eastern Ostrich, fairly common in the Arabian Peninsula, Syria, and Iraq, which however is now extinct. Cream-coloured ostrich eggshells have a slightly pitted surface. Due to their naturally curved shape, they were usually roughly cut and drilled to form small disks, disk cylinders or short cylinders of various sizes. Ostrich eggshell beads can be associated with a long-lived Nubian tradition spanning from the Mesolithic up to post-medieval times.

Find no	Findspot, Context	Material	Length and shape	Diameter (mm)	Length (mm)	Hole diameter (mm)	Figure no	Bibliography
AN-18-62	Abu Nafisa, Area 2, layer 2	Faience	Standard oblate	4.0	3.5	1.5	9.1.7	Drzewiecki *et al.* 2018, Pl. 13
AN-18-63	Abu Nafisa, Area 2, layer 4	Faience	Standard oblate	4.0	3.0	1.5	9.1.8	Drzewiecki *et al.* 2018, Pl. 13
AN-18-64	Abu Nafisa, Area 2, layer 1	Glass	Globular (a half)	8.5	7.0	3.0	9.1.9	Drzewiecki *et al.* 2018, Pl. 13
HK1-18-41	Surface	Ostrich eggshell	Short cylinder	3.5	1.5	1.5	9.1.1	Drzewiecki *et al.* 2018, Pl. 13
HK1-18-42	Hosh el-Kab, Area 2A, layer 2	Quartz	Long barrel	7.0	12.0	2.0	9.1.2	Drzewiecki *et al.* 2018, Pl. 13
UM-18-93	Findspot 1, surface, between stone structures and wall W (in the middle part)	Steatite	Polygonal	11.0	6.5	3.0	9.1.3	
UM-18-131	Findspot 27	Quartzite	Short oblate	7.0	5.0	2.0	9.1.4	
UM-18-132	Area 1A, Layer 1, trench enlargement to the N	Steatite	Cornerless cube	12.0	9.0	3.5; 4.0	9.1.5	
UM-18-138	Findspot F7, surface	Faience	Standard oblate	4.0	3.0	2.0	9.1.6	

Table 9.1. Beads from Abu Nafisa (AN), Hosh el-Kab 1 (HK1), and Umm Marrahi (UM) according to find number

Figure 9.1. Beads from Abu Nafisa, Umm Marahi, and Hosh el-Kab according to material; 9.1–2, 7–9 – taken in sunlight; 9.3–5 – using indoor light
(photos by Aneta Cedro, photo processing and plate design by Joanna Then-Obłuska)

The ostrich eggshell bead from Hosh el-Kab is a tiny, 3.5mm in diameter, short cylinder, perforated from both ends (surfaces around hole openings) (**Figure 9.1.1**). The bead's sides and ends are well-refined.

Small ostrich eggshell beads are very common finds at Post-Meroitic sites in the First Cataract region and up the Nile. They have been excavated in Blemmyan graves (Then-Obłuska 2016d, 41) and are also common finds in Nobadian graves (Then-Obłuska 2018b, 589–590). Interestingly, ostrich eggshell beads have been found at contemporary, late Roman/early Byzantine sites in the Eastern Desert (Then-Obłuska 2017b, 721) and in the Red Sea ports of Berenike and Marsa Nakari (Then-Obłuska 2015, 745; 2019, 275, pl. 13.3:3).

Together with large retouched disks, they are also found at burial sites associated with early Makurian tombs in the region between the Third and the Fifth Cataracts (Then-Obłuska 2014, pl. 2, cat. 193; 2016a, 139; 2016b, 743–744; 2018a, 306, pl. 2A; 2018b, pl. 4). Short cylinders of ostrich eggshell have been also identified in the region of the Sixth Cataract, e.g. in the Post-Meroitic graves at the site of Khor Shambat that lies at the confluence of the Blue and White Niles (personal observation).

The use of ostrich eggshell in Nubian beadwork continued into the medieval and post-medieval periods. Ostrich eggshell beads from that time have both the sides, and ends, well-refined (e.g. Then-Obłuska 2013, 682; 2016c, 582, fig. 1 and 586, fig. 4; Then-Obłuska and Wagner 2018, 65).

Stone

Four stone beads were registered. They differ in type of stone and in shape.

The long barrel bead was probably made of a light salmon milky quartz. Its ends and sides are well-refined.

It has been preserved only as a broken piece (Figure 9.1.2). The large beads, a cornerless cube (Figure 9.1.5) and a short polygonal bead (Figure 9.1.3), are made of steatite. While small cornerless cuboids of carnelian and glass are known from early Roman and Meroitic assemblages, no parallel for the large Umm Marrahi stone bead has been recorded from the Post-Meroitic bead assemblages so far. Another short oblate bead was made of quartzite. It is almost white in colour (Figure 9.1.4).

Stone beads of the Post-Meroitic period are easily recognised due to the distinguishable traces of their perforation (e.g. Then-Obłuska 2017a; Then-Obłuska 2013) which, however, are not discernible in the stone beads discussed here. Therefore, the stone beads from Hosh el-Kab and Umm Marrahi are modern intrusions.

Faience

Three tiny faience beads measure 4mm in diameter (Figure 9.1.6–8). The faience is characterised by a very porous core, covered with a blue glaze layer. There are bubble holes visible on the beads' surface caused by the source of alkaline in Nubian faience that is a sodium compound, natron or trona. This porosity is a diagnostic feature of Nubian faience beads found in Meroitic and Post-Meroitic contexts (Then-Obłuska 2014, 1070). The small size and oblate shape of the beads under discussion characterise a type common in the Post-Meroitic and late Post-Meroitic periods from sites along the Nile between the First Cataract and the confluence of the Blue and White Niles (e.g. Then-Obłuska 2014, pl. 2, cat. 227; 2016a, 141; 2016b, 747; 2017a, 692–693; 2018b, 590–591, pl. 6.1). A rather restricted use of tiny faience beads continued in Nubia into the medieval period, which was when large ring and oblate specimens dominated Nubian faience bead assemblages (e.g. Then-Obłuska 2016c).

Glass

A bead globular in shape, preserved as a half, measured *c*. 10mm in diameter (Figure 9.1.9). The bead was made of wound translucent green glass. While beads of drawn glass dominated Post-Meroitic glass bead assemblages, specimens made by winding glass around a rod also feature. A smaller example, 6.5mm in diameter, of wound green glass was found in a late Post-Meroitic tomb in El-Zuma. A chemical compositional study of the El-Zuma specimen indicated an Egyptian provenance for the glass (Then-Obłuska and Wagner 2019b, 236, cat. SNM 63).

In an attempt to identify the origin and dating of the glass used to manufacture the glass bead, a sample from Abu Nafisa was investigated at the Biological and Chemical Research Centre of the University of Warsaw, Poland, using laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS). The LA-ICP-MS method was selected to evaluate the elemental composition of the glass beads in a sensitive and minimally destructive manner, allowing for maximum protection of the investigated item.

An Inductively Coupled Plasma Mass Spectrometer NexION 300 (Perkin Elmer SCIEX, Canada) equipped with the laser ablation system LSX-213 (CETAC, USA) was used. The laser ablation set up combines stable, environmentally sealed 213nm UV lasers (Nd-YAG, solid state) with a high sampling efficiency, variable 1 to 20 Hz pulse repetition rate and maximum energy up to 5 mJ.puls-1 (LSX-213). All experiments were performed using Ar as the carrier gas. Instrumental settings and data acquisition parameters are given in (**Table 9.2**).

Standards: Three different types of Archaeological Reference Glasses (created to mimic historic glass recipes) were investigated to evaluate the results precision and accuracy: Corning Glass B is Na-rich/Ca-bearing silicates; Corning Glass C is rich in Pb and Ba; Corning Glass D is K and Ca-rich silicate (Brill 1972; 1999). Standard glass NIST SRM 610 was used as the external standard. The results for all samples were calculated with SiO_2 as the internal standard and the normalisation to 100 wt.% procedure. For all measurements, the samples were placed inside the ablation cell with NIST SRM 610 and with the selected Corning Glass. The preferred reference values for the NIST 610 were used from GeoReM (http://georem.mpch-mainz.gwdg.de/sample_query_pref.asp), while the reference values for Corning Glass were compiled from Brill (1972; 1999) and Wagner *et al*. (2012). The calibration material was measured twice at the beginning and twice at the end of each run to correct for eventual instrumental drift.

Three replicate single point ablations at the glass surface were carried out on each sample. Transient signals were recorded and evaluated for the subsequent elemental quantification. The LA-ICP-MS signals were background corrected and integrated using an Excel program. The signal for integration was individually selected considering the corrosion of the glass surface, therefore the first seconds of the transient signals were

Laser ablation characteristics and settings	
	Quantitative analysis
LA system	LSX-213
Wavelength, nm	213
Pulse duration, ns	5
Energy, mJ	5.0
Beam diameter, μm	100
Repetition rate, Hz	20
ICP-MS characteristics and settings	
RF Power	1045
Neb. gas flow rate, $Lmin^{-1}$	0.98
Plasma gas flow rate, $Lmin^{-1}$	16.0
Carrier gas	Ar
ICP-MS data acquisition parameters	
Scanning mode	Peak hopping
Dwell time, ms	10
Pre-integration time, s	20
Integration time, s	460
Isotopes monitored	^{7}Li, ^{11}B, ^{23}Na, ^{26}Mg, ^{27}Al, ^{29}Si, ^{31}P, ^{35}Cl, ^{39}K, ^{43}Ca, ^{45}Sc, ^{49}Ti, ^{51}V, ^{53}Cr, ^{55}Mn, ^{57}Fe, ^{59}Co, ^{61}Ni, ^{65}Cu, ^{66}Zn, ^{75}As, ^{85}Rb, ^{88}Sr, ^{89}Y, ^{90}Zr, ^{95}Mo, ^{109}Ag, ^{111}Cd, ^{118}Sn, ^{121}Sb, ^{133}Cs, ^{137}Ba, ^{139}La, ^{140}Ce, ^{143}Nd, ^{178}Hf, ^{182}W, ^{197}Au, ^{202}Hg, ^{208}Pb, ^{209}Bi, ^{232}Th, ^{238}U

Table 9.2. Instrument settings and data acquisition parameters

withdrawn from calculations to omit the influence of the corroded internal glass layers on the bulk information about the original glass composition.

The analysis confirmed that the specimen was composed of a plant-ash-soda-low-alumina glass type, v-Na-Ca. The glass has a high potash and magnesia content (>1.5%) that is usually associated with the use of soda plant ashes (**Table 9.3**). Elevated quantity of MgO (3.5 wt.%) and K_2O (1.7 wt.%), as well as high P_2O_5 (0.4 wt.%), was observed in the Abu Nafisa sample. The translucent green glass sample might have been coloured by the presence of iron (1.6 wt.% Fe_2O_3), copper (0.9 wt.% CuO), and lead (0.2 wt.% PbO) as no other colouring element was present in significantly high concentrations.

Some Roman period glasses were probably made using Egyptian plant-ash glass (Picon *et al*. 2008; Rosenow and Rehren 2014). They were identified at Wadi Natrun and Bubastis. However, the Wadi Natrun plant-ash glass is richer in Al_2O_3 (4–7 wt.%). The Bubastis dark green-turquoise translucent vessel glass has high potash (1.2–1.8 wt.% K_2O), magnesia (1.4–3.4 wt.% MgO), and very high phosphorus oxide (0.4–1.1 wt.% P_2O_5) and would roughly match the Abu Nafisa composition. However, levels of CuO (*c*. 0.03 wt.% and below) and CaO (<8.9 wt.%) are lower than in the sample under discussion and levels of NaO (>14.3 wt.%) are higher. The Abu Nafisa composition can be also compared to results for green glass beads from Nubia, defined as the m/v-Na-Ca glass (low-alumina glass of natron or plant-ash soda) (Then-Obłuska and Wagner 2019a; 2019b, 110), however, Nubian samples of this glass have much lower levels of MgO (1.2–2.5 wt. %).

Sasanian glass is the best known for the period under discussion among Asian plant-ash soda lime glasses (Brill 1999; Mirti *et al*. 2008; 2009). The contents of trace elements Rb (9 ppm) and Li (8 ppm) exclude an affiliation of the Abu Nafisa sample with Sasanian glass. Mirti *et al*. (2009) shows that Sasanian glass has Rb contents ranging from 9 to 27 ppm, and Sasanian glass identified in a bead from Quseir has Rb and Li levels at about 20 ppm (Then-Obłuska and Dussubieux 2016).

In addition, a composition of the Byzantine glass defined as plant-ash, called the Magby group (Magnesium Byzantine glass), and dated to a late 6^{th} – to early 7^{th} century (Schibille *et al*. 2016) does not fit the Abu Nafisa glass. The Magby group glass has higher levels of Na_2O (> 12.5 wt.%) and lower levels of MgO (< 2.6 wt.%) (Schibille *et al*. 2016, fig. 7, S1 Table: High Mg).

The Abu Nafisa bead was most probably made of Islamic plant-ash soda glass. In general, toward the end

wt. %	AN-18-64 - green
SiO_2	62.7
Na_2O	11.9
MgO	3.48
Al_2O_3	1.66
P_2O_5	0.355
K_2O	1.65
CaO	10.7
Sb_2O_5	0.0255
MnO	0.0598
Fe_2O_3	1.55
CuO	0.936
SnO_2	0.0029
PbO	0.197
TiO_2	0.008
ppm	
Li	8
Cl	6082
B	31
Sc	<LOD
V	12
Cr	18
Ni	27
Co	37
Zn	32
As	73
Rb	9
Sr	513
Zr	24
Ag	1
Cs	<LOD
Ba	116
La	4
Ce	7
Au	<LOD
Y	4
Bi	9.0
U	0.3
W	<LOD
Mo	<LOD
Nd	2
Hf	<LOD
Th	0.7

Table 9.3. Major, minor, and trace element composition of the sample. The LOD (Limits of Detection) range from 1 ppb to 1 ppm for most of the elements

of the 1st millennium AD, the use of natron declined and a return to plant ash had occurred by the 8th century AD. It became the dominant glass type throughout the Middle East and the Mediterranean and is generally called early Islamic glass (Gratuze and Barrandon 1990; Henderson *et al*. 2004). Looking at the recently published plot of MgO and K_2O presented for early Islamic plant-ash soda glass from Samarra (Iraq) and Egypt/East Mediterranean (Levantine) (Schibille *et al*. 2018, fig. 2), the Abu Nafisa data would match Egyptian/East Mediterranean results. Looking at average compositional characteristics of the main glass groups for early Islamic Egyptian glass weights (Schibille *et al*. 2019, table 1), the Abu Nafisa sample would best match the group with the lowest level of Zr (36.1 ppm), Al_2O_3 (1.62 wt.%) and TiO_2 (0.083 wt.%) and the highest level of Sr (492 ppm), i.e. Levantine plant-ash soda glass group (Phelps 2018), dated between the 10th and the beginning of the 11th century AD (Schibille *et al*. 2019, fig. 4). Such affiliation would suggest that the glass bead from Abu Nafisa is another intrusion in the context.

Conclusion

Of the nine beads found at Abu Nafisa, Umm Marrahi, and Hosh el-Kab, the ostrich eggshell, faience, and glass bead types have parallels with Post-Meroitic or medieval specimens from Nubia. Chemical composition analysis of the green glass of which the Abu Nafisa bead was made suggests it is early Islamic, more precisely Fatimid in date, and of Levantine origin; therefore, it is an intrusive object in the find context. The stone beads are most probably modern intrusions. The identifications of the stone materials (steatite, quartzite) are consistent with the actual appearance of these stones.

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APPENDIX 2

PLANT REMAINS

Agata BEBEL-NOWAK

Two archaeobotanical samples were analysed: soil sample P/UM/48, coming from a hearth in fort Umm Marrahi, Area 3B, and a sample of mud mortar, P/HK1/11, coming from the core of the north curtain wall in fort Hosh el-Kab, Area 1. Radiocarbon dating suggests that both samples date to the 6th century AD.

Both samples were measured in the dry state, giving a total volume under 300ml. Chunks of mud were disaggregated carefully with a pestle. As the number of samples was very limited, and it was probable that they contained desiccated plant remains, it was decided to conduct dry sieving in order to recover these plant remains. Samples were dry-screened one at a time using 0.5 and 1.0mm sieves. The processes of dry-sieving and flotation produced two fractions for every sample: light and heavy. Both fractions were examined with the use of a binocular microscope for the presence of macrofossil fragments.

The mud mortar sample (P/HK1/11) turned out to be free of plant remains. Occasionally, mud could be reinforced by adding chopped straw or other fibrous plant material (Moropoulu *et al*. 2005), but after examining only one sample of mud, it is impossible to state with certainty that this was not practiced at the site.

Analysis of soil sample P/UM/48 revealed some mouse coprolites and carbonised *Ziziphus spina-christi* endocarps (one complete, one partially damaged and some fragments) (**Figure 10.1 and Figure 10.2**). *Ziziphus* sp. remains are a common find at Sudanese archaeological sites (Beldados 2018; Constantini *et al*. 1983; Magid 1984; Majid 1989). The earliest remains of *Ziziphus spina-christi* in Sudan are attested from sites dated to 90,000–60,000 years BP, and the plant is still cultivated today (Beldados 2015, 2018).

The genus *Ziziphus* is a member of Rhamnaceae family which consists of *c*. 100 shrubs and trees from the world's tropical and subtropical regions (Johnston 1963). *Ziziphus spina-christi*, known as Christ's thorn jujube, is native to Sudan (Dafni *et al*. 2005) and is a species of an evergreen small tree. If it is over-exploited (by grazing, as a fuel or building material) it develops only into a spiny shrub (Odeid and Mahmoud 1971; Miehe 1986). It is highly resistant to heat and water limitations (National Academy of Science 1980), and also has a capacity to recover, even from fire (Grice 1996). It is reported to grow in semi-arid regions with altitudes up to 600m and rainfall between 50 and 300mm and it is found on a wide range of soil types, but prefers silty ones (Beldados 2018; Maydell 1986;

Figure 10.1. Mouse coprolites found in sample P/UM/48 (photo by Agata Bebel-Nowak)

Figure 10.2. Endocarps of *Ziziphus spina-christi* recovered from sample P/UM/48 (photo by Agata Bebel-Nowak)

Vogt 1995). It may reach 5–10m in height with a trunk diameter of 450mm, the spines are light-brown and paired, leaves are simple and ovate-lanceolate, flowers are greenish to yellow, and they occur in clusters (El Amin 1990; Arbonnier 2004).

The reason for the popularity of the species may be found in the multipurpose uses of the plant. It has wide range of applications and is present in number of cultures and traditions across Africa and the Near East. This is why it is also common in Sudan, where it is found in many archaeological contexts (Beldados 2018). The leaves of the plant are used to treat injuries and are consumed by sheep and goats; the wood is exploited as a fuel and building material (El Amin 1990; Beldados 2015; Dafni *et al*. 2005). The fruits and seeds, consumed by humans fresh or dried, are a rich source of carbohydrates, ascorbic acid, proteins and fibre, and micro and macro elements (Saied *et al*. 2008; Dafni *et al*. 2005). They are also used in medicine (to prevent diseases, to treat fever, pain, inflammation, dysentery, eye and lung diseases) (Asgarpanah and Haghighat 2012).

The plant was very popular in ancient Egypt – it was considered sacred; used in carpentry, medicine and in the production of offering bread (Dafni *et al*. 2005; Neumann 2003). The species is also frequently mentioned in Muslim and Christian traditions (one can find reference to the tree in both the Bible and the Quran) (Dafni *et al*. 2005). Seeds of *Ziziphus spina-christi* are used by Muslims as rosaries (Saied *et al*. 2008); they also use water in which Ziziphus' leaves were soaked to wash the dead (this is why it is planted at cemeteries) (Dafni *et al*. 2006). Christians believe that Jesus was crowned with branches of this plant before he was crucified (Dafni *et al*. 2005) – which is the source of the plant's scientific name. The trees are revered in Israel (Dafni *et al*. 2005).

Further analysis of a larger number of archaeobotanical samples is necessary to understand the role and processing methods of this plant at the site. As was stated above, the plant was very popular in culture, religion, diet and economy in a number of past societies, hence a more detailed analysis of plant remains may help to determine the role of *Ziziphus spina-christi* at this specific site, and to reconstruct its meaning to the past local community. So far, we can only assume that *Ziziphus spina-christi*, which is a typical find at Sudanese archeological sites, was exploited here.

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