

# KHOR SHAMBAT 1: NEW NEOLITHIC SITE AND CEMETERY IN OMDURMAN (SUDAN)

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**Abstract:** The locality of Khor Shambat in the Omdurman district of Khartoum was investigated in 2012. The site lies between two gorges draining water to the Nile Valley from the west. Testing established the site stratigraphy, dating the cultural level to the early Neolithic. The source material from this cultural level included vessel-type ceramics, microlithic stone artifacts, macrolithic stone tools and faunal remains. A cemetery containing 13 graves was investigated, the alignment of the burial pits and position of the interments leading to the conclusion that it started as a Neolithic burial ground and continued as a cemetery probably in Meroitic and post-Meroitic times. The archaeological, anthropological and archaeozoological data contributed new information on settlement on this site and in the broader overview, in central Sudan.

**Keywords:** Khor Shambat, Early Khartoum, Neolithic, cemetery, graves, settlement, pottery, lithic inventory, archaeozoology

In December 2012, at the request of the National Corporation for Antiquities and Museums in Khartoum (NCAM), the African Prehistoric and Early Civilisation Research Group from the Institute of Archaeology and Ethnology, Polish Academy of Sciences, opened investigations of a newly discovered Neolithic locality in Omdurman, Khor Shambat 1. The locality had been damaged by road

construction and was endangered by new residential complexes being built around it. An initial superficial reconnaissance conducted by members of the mission proved the enormous potential of the site, justifying further rescue and reconnaissance work. The project was conducted on behalf of the Polish Centre of Mediterranean Archaeology of the University of Warsaw.<sup>1</sup>

<sup>1</sup> In lieu of continued excavation of the Kadero 1 site under the auspices of the PCMA, for which military security approval was not issued (the site is located next to a military base) and in view of the fact that the license, with the PCMA from 1972 to 2003, had already been transferred by the NCAM to the University of Bahri (former University of Juba).

## LOCATION

The name of the locality, Khor Shambat, derives from the name of a large wadi stretching from the west to the Nile, around 8.5 km from the spot where the White Nile meets the Blue Nile and 1.2 km north of the archeological site [Fig. 1]. The location is also known from historic times; it was here that on 2 September 1898 the famous Battle of Omdurman took place (Churchill 2006 [1902]: 269–300). Currently, it is part of the district of Omdurman situated on the bank of the Nile (local name is Tabiad el Salha). Site 1 is located around 0.2 km west of the river and 3.5 km north

of the bridge that is part of Sharia Shambat, the road passing from Omdurman to north Khartoum. The site lay on a sand dune elevated 384–385 m above sea level (around 5 m above the current maximum overflow level of the river), between two smaller gorges (khors) draining water seasonally to the Nile Valley. The site is bordered on the west by a modern residential district and on the east by a clay pit and a highway running alongside the Nile. The northern part of the site is occupied by a farm, while the southern section is a local refuse dump [Fig. 2].

## RESEARCH

The site was discovered in October 2012, during an intervention by Mahmoud Suleiman al Bashir (NCAM) at the construction site of a new local road, and archeological rescue research was launched immediately [Fig. 2]. Graves observed in the sections of the road excavation were explored and documented. The site was surveyed to determine its reach and stratigraphy, estimate damage, establish settlement chronology and assess research potential.

Four excavation trenches (I, II, IV and V) were dug on a N–S alignment, covering the burial pits visible in the road excavation section. Unit III was situated along an E–W axis and perpendicular to trench I. The total area of the excavation trenches was around 60 m<sup>2</sup> [Fig. 3].

As a result of the work conducted, the following layer stratigraphy was identified: the limestone bedrock (level 1) covered with strongly eroded iron-rich mudstone

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(level 2) which constituted the subsoil (sterile earth) of the excavation. Above these was a layer made up of grey dusty sand (level 3) most probably of aeolian origin (Mrozek-Wysocka 2013). Its thickness ranged from 50 cm to 80 cm. This layer, characterized by moist consistency, was completely filled with remains from the cultural layer and included ceramic, shell and animal bone fragments, as well as stone artifacts. The entire area was covered by a modern gravel midden layer (level 4) with a thickness of 10 to 30 cm [Fig. 4].

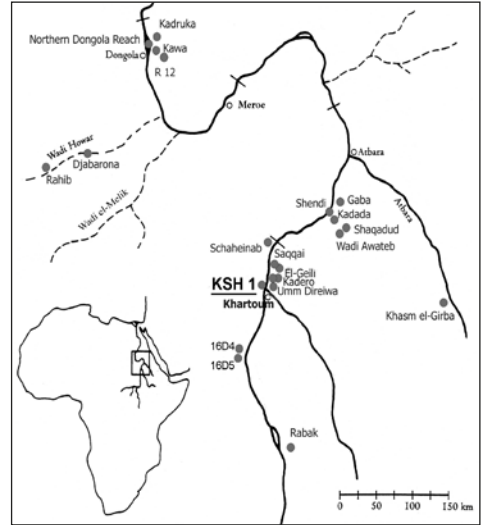
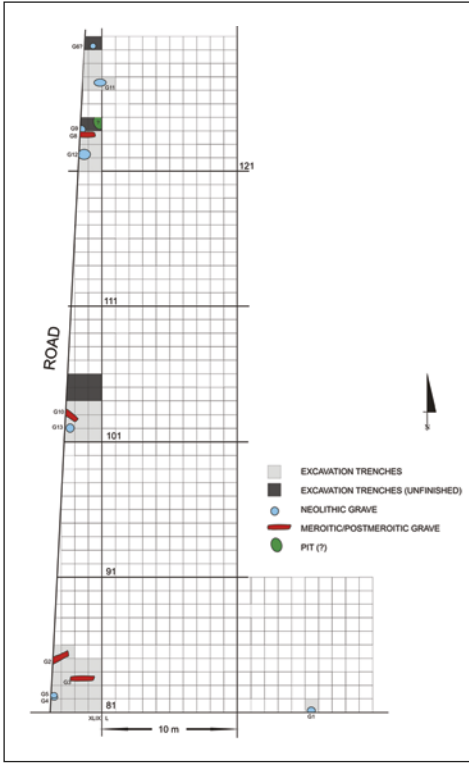


Fig. 1. Location of the Khor Shambat 1 site (Drawing M. Jórdeczka)



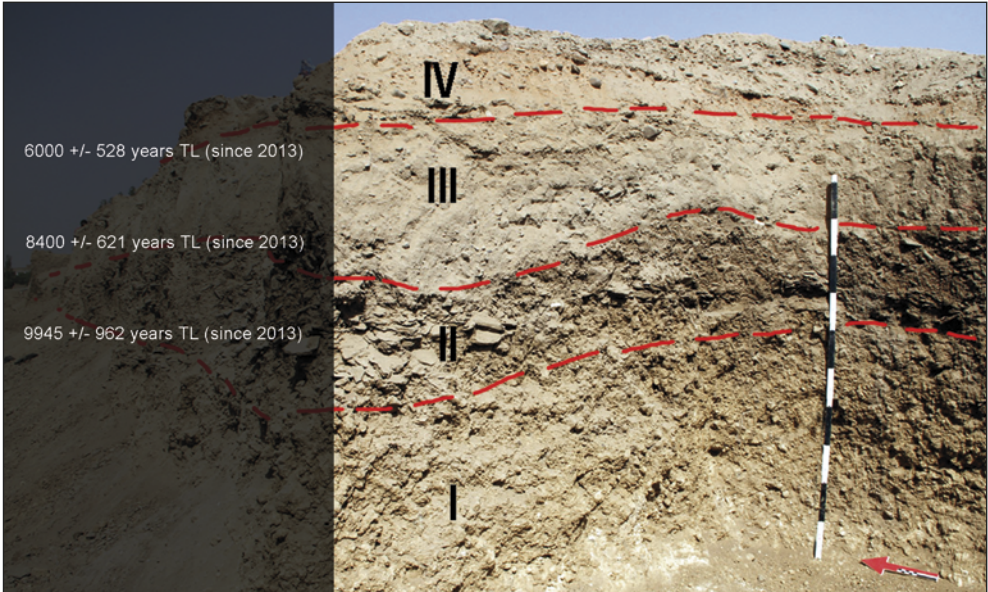
Fig. 2. KSH 1. Aerial view of the site (Courtesy Google Maps 2015)



Samples were collected for OSL and IRSL dating from the layer of iron mudstone (sterile earth) and dusty sand (cultural layer). For the sterile earth level, a date of 9945 +/- 962 years TL (since 2013) was obtained, while two dates 8400 +/- 621 and 6000 +/- 528 years TL (since 2013) were obtained for the cultural layer level (Kusiak 2013).

Fig. 3. Plan of site KSH 1 (Drawing M. Jórdeczka)

Fig. 4. Stratigraphy of the site: levels 1 – limestone bedrock; 2 – sterile strongly eroded mudstone; 3 – grey dusty sand of aeolian(?) origin; 4 – modern gravel midden layer (Photo and processing M. Jórdeczka, P. Bobrowski)



## SETTLEMENT

The cultural level, set below the present-day midden layer, contained varied source material. Among the artifacts registered throughout the excavation, over 4750 fragments of vessel-type ceramics, 735 microlithic stone artifacts, 94 macrolithic stone tools and 370 animal bone fragments were discovered. An initial analysis of the most

diagnostic category of artifacts, namely the ceramics showed that around 98% of the collection should be associated with the Neolithic phase of the settlement. This conclusion affects the assessment of the remaining categories of mass artifacts which could be associated with the same time-frame.

## POTTERY

Ceramic vessels from site KSH 1 constitute a rich collection totaling 4751 pieces which provides the basis for determining settlement chronology.<sup>2</sup> The earliest material is related to Early Khartoum Culture, while the latest insignificant remains of ceramic vessels could probably be tied to the early phases of the late Neolithic. Virtually all the sherds come from the exploration of the cultural layers. A few pieces found in the fill of grave pits (like grave 5) were most likely not part of the grave goods.

The process of producing ceramics begins with the selection and preparation of the clay, and continues with production and finishing, to end with use and discard of the pots (Garcea 2007: 101). Decoration is but one of the stages in the *chaîne opératoire* of pottery manufacturing. The technical aspects of preparing the material and its characteristics are not always clearly identifiable in the case of finished products; nevertheless, we are still able to recreate at least part of the operation chain. As Elena Garcea notes (2007: 103), clay preparation tends to be the result of habit, rather than cultural tradition with symbolic meanings.

The clay fabrics at Khor Shambat show much the same kind of chronologi-

cal variation as at other sites in the region, such as El Shaheinab (Garcea 2007: 103): Early Khartoum pastes are predominantly medium-, less often coarse-grained, whereas Neolithic fabrics are prevalently fine. According to Garcea (2007: 103), certain chronological differences can be seen also in the decoration technique. During the early Khartoum period at El Shaheinab, most of the ceramics bore impressed decoration featuring medium sphericity, high roundness and medium size, a mix of characteristics that disappears almost completely in later periods.

Early Khartoum ceramics at KSH 1 make for about 1.5% of the inventory and were distinguished on technological grounds, as well as on the presence of incised and dotted wavy line [*Figs 5: 1, 2, 4, 6; 6 top right*], rocker stamp (packed zigzag) and simple impression motifs. The vessels were made by hand, using most likely local material, namely Nile silt, and applying temper of crushed rock 0.2–1 mm thick (mostly incised wavy line) and coarse sand with grains ranging from 0.2 mm to 5 mm (dotted wavy line). In both cases, the average thickness of the ceramics amounted to 8–9 mm, with extreme values ranging from

<sup>2</sup> The authors are indebted to Dr. Marek Chłodnicki for his kind assistance in the study of ceramics from Khor Shambat.

5 mm to 12 mm. The most common color of the fracture is brown and dark grey. One pointed base with traces of rocker stamp motif was found, probably also connected with the Early Khartoum phase of the site.

Ceramics decorated with the wavy line motif represent most likely the oldest settlement phase of the site. At the present phase of research, it is difficult to define its exact chronology, but a look at radiocarbon dates from other sites in the Middle Nile, such as Saggai, Sarurab, Shaqadud, Abu Darbain, El-Damer or Aneibis, Sadik suggests a chronological frame for the Early Khartoum settlement between 8600 and 5500 BC (Sadig 2010: 29). Wavy Line ceramics from the Nile Valley are undoubtedly one of the oldest in Africa (see Jesse 2003; Jórdeczka et al. 2011), and further research on the material from KSH 1 could provide even more information on the topic.

Ceramics associated with the Neolithic phase of the settlement are rather standardized in terms of form; they are mostly semicircular bowls of different depths and spherical jars with rounded bottoms, made by hand and probably from local Nile silt. A mineral temper was applied, mainly using sand, less often crushed rock. Based on a macroscopic analysis of the size of mineral inclusions, we can conclude that the prevailing ware had fine- (<0.25 mm) and middle-sized temper (0.25–0.50 mm). The most common color of the fracture is dark grey, black and dark brown, occasionally pale brown. The basic surface color predominant on the uncoated surfaces of vessels from KSH 1 is mostly different shades of brown, gray, dark grey and red. Surface coating with red ochre was a frequent practice; this applies however mostly to thin-walled vessels (“table” ware). The most

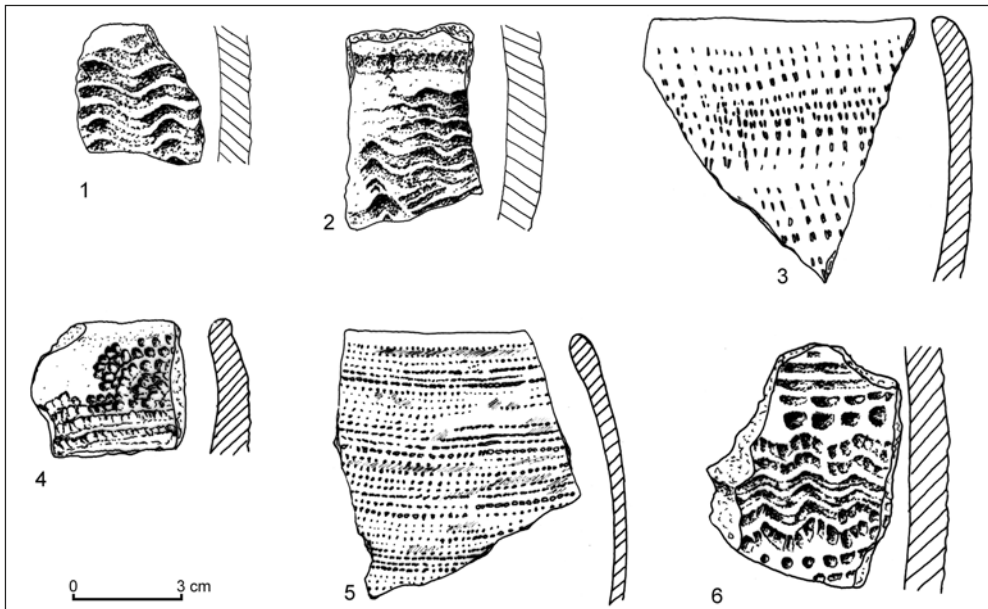
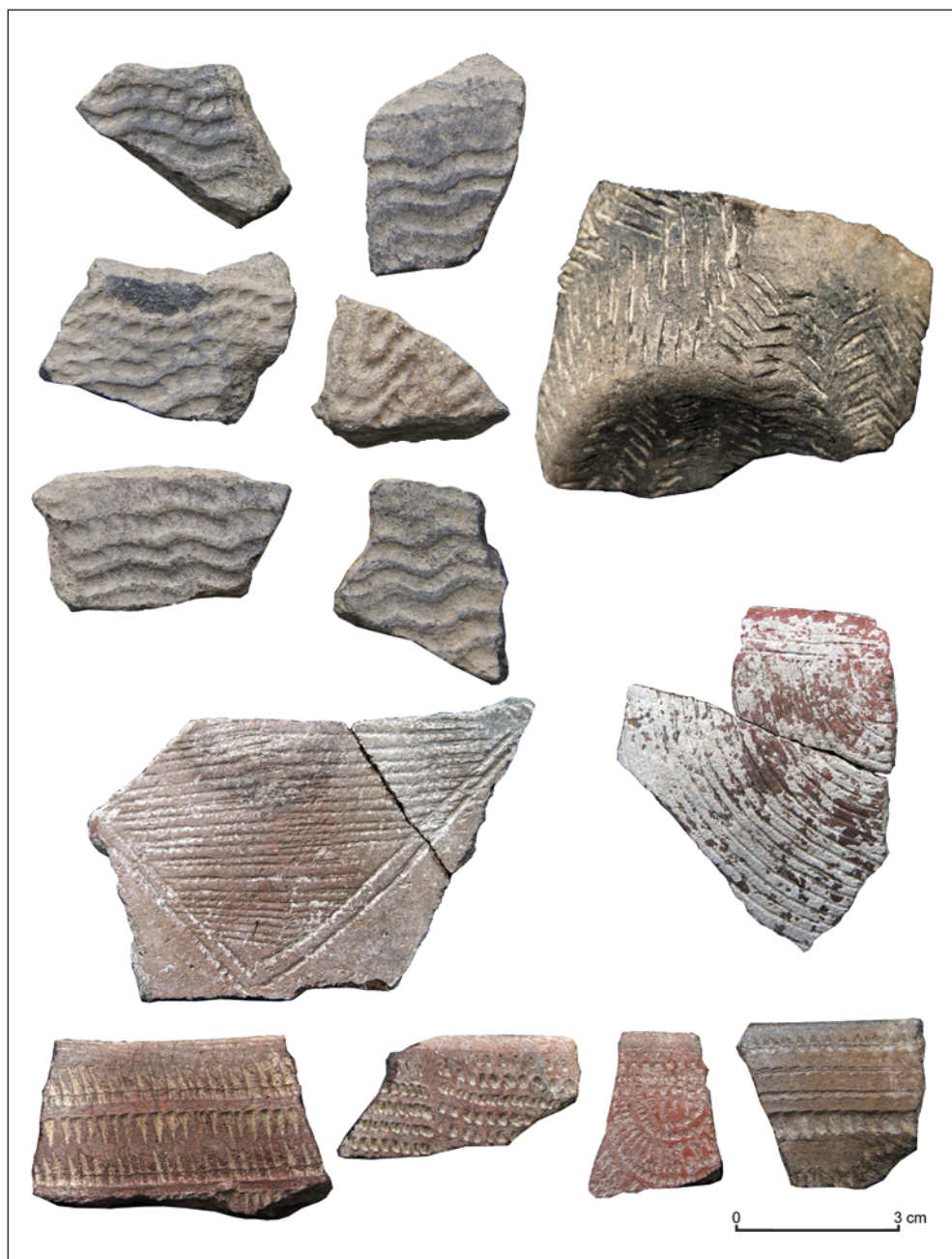


Fig. 5. Pottery from KSH 1  
(Drawing A. Hurnowicz)



*Fig. 6. Pottery from KSH 1  
(Photos M. Jórdeczka)*

Table 1. Pottery from KSH I

No.	Trench	Sq	Sq	Layer	Pottery												Remarks
					Ornamented			Non-ornamented			Chronology			Remarks			
					Rim	Body	Bottom	Rim	Body	Bottom	Early Khartoum	Khartoum Neolithic	Late Neolithic				
1	I		Surface				7	48		2	40			97			
2	I			Mixed			4	28			13			45			
3	I	80-84	XLVII-XLVIII	Bottom of modern midden/top of cultural layer			7	46		1	10		2	62			
4	I	80-84	XLVII-XLVIII	1			28	129		4	69		1	229			
5	I	80-84	XLVII-XLVIII	2			8	92		6	58		1	163			
6	I	85	XLVII	1			5	14			18			41			
7	I	85	XLVII	1/2						1	4			5			
8	I		Around grave 4				1	5			15			21			
9	II	101-107	XLVIII-XLIX	1			7	34		6	57			105		2 black top	
10	II			2			7	34		4	49		2	94			
11	II	101-102	XLVIII-XLIX	3			8	83		8	102			201		1 fragment with hole, 1 ornamented black top	
12	II	101-102	XLVIII-XLIX	4			12	92		3	57			164			
13	II	101-102	XLVIII-XLIX	5			10	76		3	70			159		1 fragment with hole	
14	II	103-104	XLVIII-XLIX	3			14	122		8	102		2	244		1 fragment with hole	
15	II	103-104	XLVIII-XLIX	4			8	108		7	54		16				
16	II	105-106	XLVIII-XLIX	3			13	77		13	85		4	184			
17	II	105-106	XLVIII-XLIX	4			4	79		9	64		1	155			



Table 1. Continued

No.	Trench	Sq	Sq	Layer	Pottery												Remarks
					Ornamented			Non-ornamented			Chronology			Late Neolithic			
					Rim	Body	Bottom	Rim	Body	Bottom	Early Khartoum Neolithic	Khartoum Neolithic					
18	II	XLVIII-XLIX	107	3	6	9		3	31		1	48			1 black top		
19	III	XLVIII-XLIX	78-79	1	15	63		4	27			109					
20	III	XLVIII-XLIX	78-79	2	10	93			26			129					
21	III		Around grave 1		5	68		3	32			108					
22	III		Under grave 1		8	60		3	5			76					
23	III		Profile under grave 1		3	13		2	3			21					
24	IV	L		1	7	11			41			59			1 black top		
25	IV	XLIX		2	7	29		3	27			66					
26	IV		122-124	3	3	15		4	15			37					
27	IV	L		1	4	9		1	18			32					
28	IV	L		2	9	101		4	62			176			1 fragment with hole, 1 black top		
29	IV			3	12	83		5	81		1 IWL	181					
30	IV			1	2	14		1	23			40					
31	IV			2	4	46		5	64			119			1 black top		
32	V		Around grave 6		2	17			12		1	30					
33	V			1	7	44		5	76			132			2 black top		
34	V			2	3	15		2	25			45					
35	V			3		23		4	28			55					

Table 1. Continued

No.	Trench	Sq	Sq	Layer	Pottery												Remarks
					Ornamented			Non-ornamented			Chronology			Late Neolithic			
					Rim	Body	Bottom	Rim	Body	Bottom	Early Khartoum	Khartoum Neolithic					
36	V		128	1		5	19		2	30			56				
37	V		128	2		6	46		5	65			122				
38	V	L	128-132	3		30	210		21	255		7	516				
39	V		Around grave 7			9	28		8	82			127				
40	V		Grave 7				4			4			8				
41	V	LI	128; under grave 7	3		14	61		10	114		2	197			1 fragment with hole, 1 black top	
42	V		Around grave 11			7	9		2	13			31				
43	V		Grave 11			2	1			4			7				
44	I		Grave 4						3	14			17			1 fragment with hole	
45	IV		Grave 13			3	13			8			24				
46	I		Grave 3										1			1 black top	
47	I		Grave 5			2	2						4				
48	Surface					1	5		4	1		5	3			3	
49	I	XLVIII	84	3													
50	I	XLVIII	84	3													
51	I	XLVIII	84	3													
52	I	XLVIII	84				2		1	9							
53	I		Grave 6														
Total						329	2180		180	2062							

popular are straight, simple rims, mostly rounded in shape, sometimes slightly pointed or thickened. Modeled reverted or everted rims are rare.

Decoration motifs are greatly diverse. Nearly 53% of the collection has traces of decoration, above all with an impressed (simple impressions, rocker stamp and alternately pivoting stamp technique) and incised ornament [*Figs 5:3,5; 6*]. Body decoration motifs were varied and included a zigzag of dotted lines produced with rocker stamp technique, different combinations of triangles or vees and dots between them produced with the rocker stamp technique (most popular), a continuous zigzag line, parallel lines of impressed dots, different incised decoration with concentric or asymmetric structure, parallel, horizontal incised lines. Geometric motifs also appear, such as rows of triangles filled with dots or lines, rows of parallel lines filled with dots, triangular impressions and dots in a concentric arrangement. Combed pottery occurs on the site, but is very rare.

Rim top decoration was quite common, mostly dotted lines made with a comb stamp, strokes or lines made with the edge of sharp tool and rarely single stamp motifs.

The so-called black-top ceramics also appear in relatively small quantities, superbly made and arguably constituting a group of special vessels (observed in Kadero mainly in graves, rarely in settlement materials, Chłodnicki 2011: 257). Rim top decoration is also common in this group.

Individual sherds decorated with geometric motifs (including flat-bottomed vessels) can be attributed to the early phases of the late Neolithic [*Fig. 6* bottom].

Very little is still known regarding this period in Sudan. Arkell (1947) was the first to identify it at the Omdurman Bridge site, later a few sherds were discovered in the Shendi Reach, at the cemetery in Kadada and in al-Ghaba. Dates from Kadada range between 3650–3350 BC (Edwards 2004). Similar material also originates from the site in Geili where it lies partly on early Neolithic material (Caneva 1988).

## CHIPPED STONE INVENTORY

The chipped flint inventory totals 735 artifacts from five trenches. Only a few artifacts were found in the fill of grave pits. However, the nature of the finds (mainly typical debitage), as well as the context of the discovery suggest that they were not deposited there intentionally. The only exceptions could be two segments found in graves 3 and 4.

The predominant material at the site was quartz (over 94% of the entire col-

lection). Other materials were only a minor supplement, among these rhyolite (15 pieces, about 2% of the collection), quartzite sandstone (13 pieces, around 1.8%) and chert (8 pieces, around 1%). Moreover, three pieces were made of basalt, one from fossilized wood and three from an undefined material.<sup>3</sup>

Rhyolite was among the exceptional materials. It appears above all in the region of the Sixth Cataract on the Nile, near

<sup>3</sup> Quartz appears in large quantities in the primary context composed of sandstone sediments of the Nubian formation that build the plateau or in the more accessible secondary context, that is, alluvia of the wadi formed as a result of the erosion of Nubian sandstone and the washout of smaller fractions by flowing water.

Sabaloka, at a distance of about 65–70 km (in a straight line) from the described site.<sup>4</sup>

Quartz appeared in the form of small pebbles, their size ranging from 1.5 cm to 3.0 cm, rarely exceeding 5 cm. The classic flaking method was employed, calling for flake blanks to be procured from single platform cores (unprepared or with single-blow trimming of the platform). Hence the domination of cortex flakes and fewer single platform flakes which most often feature cortex butts rather than smooth ones. Unidentified pieces (chunks) were also numerous. In the treatment presented here characteristic debitage categories, associated with the so-called slicing technology proposed by Michał Kobusiewicz, were also taken into consideration. The purpose was to obtain regular crescent-shaped flakes with one sharp edge to make segments that would be used as insets in composite tools (Kobusiewicz 1996; 2011: 271). Typical waste blanks were produced in the process and they appeared in large quantities at the site just as the intentional crescent-shaped flakes. Presumably, the final effect of this technological process were the insets/segments found in two of the graves [Fig. 7:1–3].

The rest of the collection is made up almost exclusively of flake blanks. These are most often flakes from classic single platform cores or less frequently, preparation flakes (fragments of some of the pieces have been preserved). Nearly all the butts of these artifacts were smooth. Their size was on average larger than comparable pieces made from quartz. The largest rhyolite flakes measured 4 cm, basalt flakes were over 5 cm, while a similar chert flake had

a length of 7 cm. One unidentified core made of chert was found at the site; it was a yellowish-brown pebble with a diameter of around 5 cm. A cobble from which an axe was made was twice as big [Fig. 7:4].

Tools were rare in the collection. Aside from the segments and chert axe mentioned above, only one notch tool made from basalt was registered [Fig. 7:5].

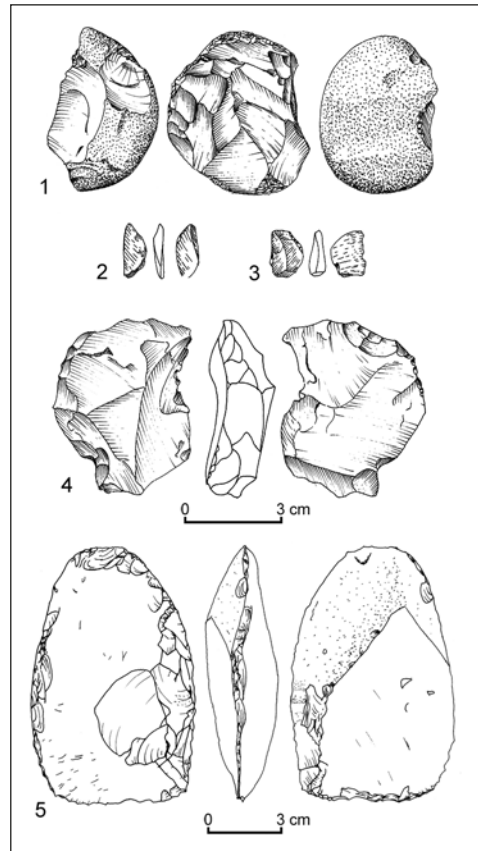


Fig. 7. Chipped flint tools: 1–3 – chert segments; 4 – chert axe; 5 – basalt notch tool (Drawing P. Bobrowski, A. Hurnowicz)

<sup>4</sup> Towards the end of prehistoric times and especially during the Neolithic it was a valued material for the production of tools. It was processed using the flake detachment technique above all, as well as grinding later on.

## MACROLITHIC STONE TOOLS

Macrolithic stone tools originated from both the surface and cultural levels. These are for the most part fragments of objects typical of sites with a similar chronology, which can also be found at other locations in central Sudan (see Jórdeczka 2011). A total of 94 objects came from the five trenches [Table 2]. None of these constituted grave goods; the only finds from graves were: a zeolite bead (Gr 5) and a lip plug made of rhyolite (Gr 12) (see below).

Handstones and their fragments prevailed (45) in the collection, along with

tools that combined the functionality of a handstone and a grindstone (7); grindstones/polishing stones were frequent (11), as were diverse anvils (8) and fragments of querns (6). Tools from these tool categories were made from different varieties of sandstone, all most likely of local origin.

The study material includes a quantity of tools made from much larger, damaged artifacts, which often originally served a completely different purpose; recycling tools was a common practice among local societies. A similar situation was noted

Table 2. *Macrolithic stone tools originating from the exploration of the cultural level, site KSH 1*

Trench	Level	Object											
		Unidentified	Polishing stone /palette stone	Mace head	Grindstone/ polishing stone	Adze	Palette	Anvil	Ring	Handstone	Auger	Hammerstone	Quern
I	1									1			
	2				1					3			
II	1												
	2						1	1		5		1	
	3				2			3		7		2	2
	4				1					4			
	5					1							
III	1									2			
	2	2			2					7			1
IV	1	1					1						
	2				1					4			
	3									2			
V	1		1				1	2		5			2
	2				1					1			1
	3				1			1		1			
Surface site		1	6	1	2			1	1	3	1	1	
Total		4	7	1	11	1	3	8	1	45	1	4	6

at many sites, for example at Shaheinab (Arkell 1953: 52–54), El Geili (Caneva 1988: 141–144) and Kadero (Krzyżaniak 1992: 188).

Higher material variability concerns polishing stones/palette stones (7), where basalt and rhyolite appeared beside sandstone and quartzite. These artifacts were made most often from pebbles and traces of ocher have been preserved on the surfaces of some of them.

Finds from the settlement included four fragments of cosmetic palettes (three of sandstone and one of granite), a sandstone auger [Fig. 8 left], a small shovel made of quartzite sandstone and a few fragments of tools of unidentified function. A fragment

of a so-called ring of sandstone also originates from the surface of the site.

These artifacts have been considered characteristic of the Early Khartoum period (Marks et al. 1985: 271; Fernández et al. 2003: 252), however, interpretation of their functionality abounds with difficulties. Arkell believed that these were mace heads (1949: 63–64), while Magid (1995: 68) and Fernández (Fernández et al. 2003: 252) recognized them rather as weights for digging sticks used to dig up the subsoil in search of edible roots, tubers, etc. A fragment of a discoid mace head made of porphyrite(?) also draws attention [Fig. 8 right]. Its presence is not only an indication of a diversified social structure,

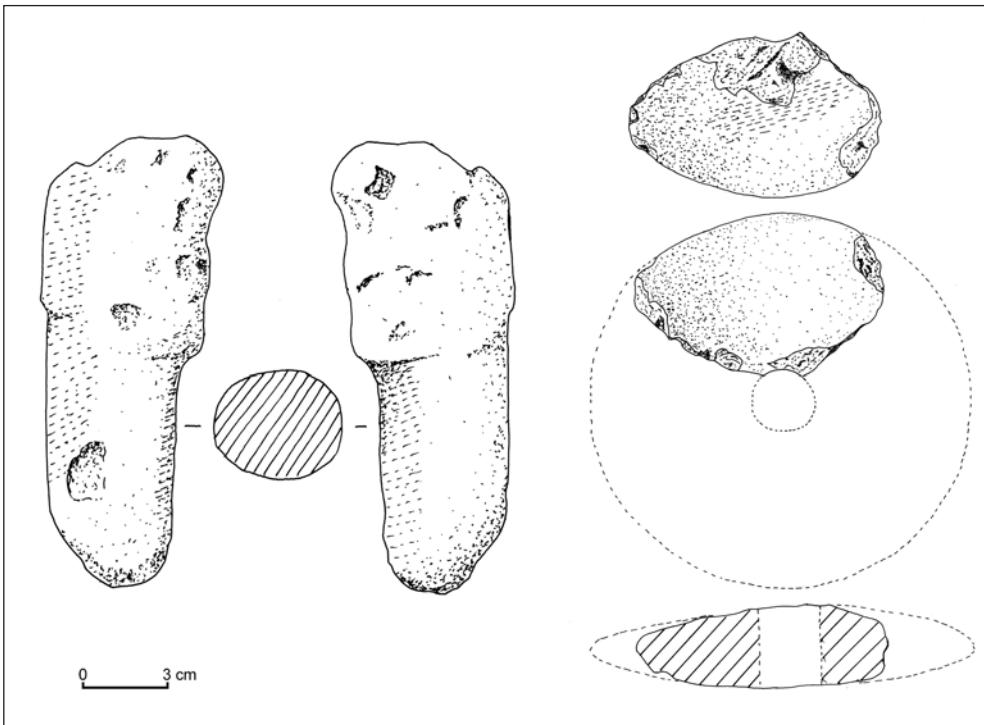


Fig. 8. Macrolithic stone tools: left, sandstone auger, and right, mace head(?)  
(Drawing M. Jórdeczka)

but may also prove the presence (noted by some researchers, e.g., Ciałowicz 2011: 328) of far-reaching contacts between other peoples from the Nubian A Group,

or even northern Egypt where similar forms have also been found (in Fayum, see Caton-Thompson and Gardner 1934; in Maadi, see Rizkana and Seeher 1984).

## PERSONAL ADORNMENTS

Personal adornments found so far at KSH 1 have been very modest. Only two graves out of 13 had burial goods (excluding grave 13 in which the presence of at least one shell was determined, yet its exploration has not been completed). In both cases, the burial goods constituted only individual personal adornments.

The adult male in grave 5 was buried with a barrel-shape zeolite bead [Fig. 9 left]. It is small in size (15 x 8 mm), has a regular shape and an opening with a diameter of 4–5 mm, made using two-sided boring. Beads are the most popular form of personal ornament that the dead were adorned with and prevalent among them where the small flat disks made of ostrich eggshells and carnelian. Barrel-shaped beads were not as common in the Neolithic age; singular beads were recognized at Kadero among others (Bobrowski 2011).

The female burial from grave 2 was provided on the other hand with a lip/ear plug made from rhyolite [Fig. 9 right]. The artifact has an oval shape in flat projection and an hourglass-shaped longitudinal section. Its diameter is 12–15 mm, with a length reaching 13 mm. Lip, nose and ear adornments were widely common

in prehistorical Sudan and known at least since the early Neolithic (Salvatori and Usai 2008: 29). They appeared in many Neolithic cemeteries, such as Shaheinab (Arkel 1953), El Geili (Caneva 1988), Multaga (Geus and Lecoite 2003), El Barga (Honegger 2004: 33) or Kadero (Krzyżaniak 1992), although the specimen from KSH 1 features a rarely seen shape.



Fig. 9. Personal adornments: left, zeolite bead, and right, lip/ear plug of rhyolite (Photos M. Jórdeczka)

## ANIMAL REMAINS

Archaeozoological analyses of the material by Marta Osypińska (2013) revealed the prevalence of long-horn primigenius cattle (*Bos primigenius f. domestica*) (43.25%).

The second group, in terms of quantity (11.79%), was made up of bones of small wild ruminants, such as the Dorcas gazelle (*Gazella dorcas*) or Soemmering's

gazelle (*Gazella soemmeringi*). Remains of the Cap buffalo (*Syncerus caffer*) were also abundant (about 8.98%). Bones of small domesticated ruminants (sheep/goat) constituted a small group in terms of volume. Also discovered were bones of a hippopotamus, grivet/African green monkey (*Chlorocebus aethiops*) and a wild species of the pig family (*Potamochoerus larvatus*). A fragmented chisel was made from hippopotamus bone (for a similar specimen from Kadero 1, see Bobrowski 2011: 350; Fig. 4:3) [Fig. 10]. The remains of two species of fish were also identified: Nile tilapia (*Oreochromis niloticus*) and African sharp-tooth catfish (*Clarias gariepinus*). The only remains of birds identified in the collection were a few fragments of eggshells of the common ostrich (*Struthio camelus*). Relatively numerous remains (severely crushed)

of malacofauna were also discovered in the cultural layer. These were made up of mussels (*Bivalvia*), as well as snails (*Pila*). Shells of the Nile mussel (*Etheria nilotica*) and the snail (*Pila opata*) were identified among these. The set of species found at the site points to the proximity of an aquatic environment (the Nile), as well as a tree and grass savannah.

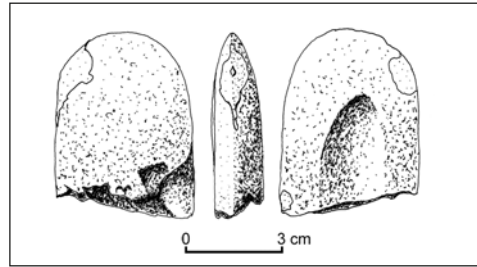


Fig. 10. Chisel of hippopotamus bone (Drawing A. Hurnowicz)

## CEMETERY

The excavation extended over an area of about 46 m<sup>2</sup>, whereby the sterile earth level was reached in the area of 35–36 m<sup>2</sup>. Excavation of the remaining 10 m<sup>2</sup> were interrupted due to time constraints and the trenches were secured and then backfilled [see Fig. 3].

Close to 20 interments were discovered in this area and 13 graves were excavated. Of these, 11 were examined. An analysis of the shape of the grave pits, their alignment and the nature of body positioning led to the conclusion that the cemetery was a multiphase one, used in the Neolithic and later, probably during the Meroitic or post-Meroitic period [Table 3].

### NEOLITHIC BURIALS

Investigations to date have revealed the presence of probably nine<sup>5</sup> Neolithic burials. Exploration of seven of these has been completed. It is not a number that allows for far-reaching conclusions regarding funeral practices in the Neolithic on this site, nevertheless a few significant observations can be presented. Above all, at least two traditions of interment can be observed and this could be connected to the differing chronology.

Most of the Neolithic burials (7) investigated so far had been placed in relatively shallow oval-shaped pits, embedded in sandy cultural layers. The outline of the

<sup>5</sup> Assuming that in the case of graves 7 and 11 there are two burials and not one destroyed.



grave pits is not fully identifiable in all places, difficulties in their identification appeared in the cases of destroyed graves 1, 7 and 11 or at the burial site of a child (grave 6). In the case of slightly deeper graves 4, 5 and 12, partially embedded in the mudstone layers, the shape of the pit could be clearly identified given the different color and density between the fill and the parent rock. In these three cases, the oval pits have a size of about 70 cm by 100 cm.

In these graves, the dead were found in a flexed position, on their right (graves 5, 7(?), 11 and 12) or left side (graves 1, 4, 12), their heads to the west.

The second type of Neolithic grave features small pits, about 60 cm in diameter, embedded several centimeters into the bedrock and reaching a depth of 120–

150 cm below the current surface. The dead were placed in highly flexed position and on their side (e.g., grave 13, the skeleton level was not reached in grave 9). Not one grave of this type was fully explored however. They may have been slightly earlier than the shallow graves embedded in cultural layers.

A detailed anthropological analysis was conducted of remains from seven Neolithic graves; the remains were identified as three males, two females and one child of unidentified gender. In the seventh case, the poor state of preservation of the skeletal material excluded determination of the sex. As far as pathological changes are concerned, the poor state of preservation unfortunately hinders this line of research. Moreover, the sample is too small to allow for any further conclusions about health or

Table 3. List of Neolithic and Meroitic or post-Meroitic graves from KSH 1

Grave number	Dating	Type and orientation of grave/position of the dead	Gender	Age
1	Neolithic	Oval pit, shallow. Flexed position, on right(?) side, head S(?)	Male	Adultus
2	Meroitic period	Rectangular pit. Extended position, head NE	Female	Adultus
3	Meroitic period	Rectangular pit. Extended position, head E, face N	Male	Adultus
4	Neolithic	Oval pit, shallow. Flexed position, on left side, head NE(?)	Male?	Adultus
5	Neolithic	Oval pit, shallow. Flexed position, on right side, head E, face S	Male	20–35 years
6	Neolithic	Oval pit, shallow. Flexed position, on left side, head E, face N	Unidentified	1–2 years
7	Neolithic(?)	Grave destroyed. Pit outline unidentifiable. Flexed position(?)	Unidentified	Adultus
8	Meroitic period	Rectangular pit. Extended position, head E(?)	Female	Adultus
9	Neolithic	Round pit, deep. Exploration unfinished	Unidentified	Unidentified
10	Meroitic period	Oval pit, irregular. Extended position, head NE	Male	15–18 years
11	Neolithic(?)	Grave destroyed. Pit outline unidentifiable. Flexed position(?), on right side, head E, face S	Female	Adultus
12	Neolithic	Oval pit, shallow. Flexed position, on right side, head E, face S	Female	17–25 years
13	Neolithic	Round pit, deep. Flexed position, on right side, head E, face S. Exploration unfinished.	Unidentified	Adultus

living conditions. Notable findings include osteoarthritis in the joints of the spine and postcranial skeleton. Osteoarthritis, manifested through pitting and eburnation on the joints (Rogers and Waldron 1995), provides important insights into general level of activity and occupation of a population. Two individuals displayed cribra orbitalia, a condition commonly associated with iron-deficiency anaemia (Stuart-Macadam 1991). However, new research has also shown that lesions in the orbital roof may be caused by an eye infection (Wapler, Crubézy, and Schultz 2004).

Pathological changes in human dentition, as well as degree and patterns of wear can provide information on dietary and occupational habits, as well as general health and hygiene in a population. Dental enamel hypoplasia was observed in one Neolithic individual (grave 12), indicating a disruption of the growth process during childhood. One individual (grave 11) displayed unusual patterns of heavy wear on the lingual side of the front teeth. This feature had been noted in other hunter-gatherer populations, both in Sudan and outside (Larsen 1997), and has been attributed to the habitual use of teeth as a tool to manipulate rough abrasive materials, such as leather and fibers.

Generally, the skeletons are in a rather poor state of preservation with very little preservation of joints. This unfortunately limits the potential for further bioarchaeological and palaeopathological research. Collagen preservation, which would allow for biomolecular analysis of stable isotopes to investigate diet or DNA, seems unlikely in these circumstances. However, the preservation of teeth could provide the basis for further biomolecular research with regard to diet (carbon and oxygen iso-

topes) or migration patterns (strontium isotopes). Furthermore, the preservation of dental calculus in skeletons would provide the potential for further insights into diet composition.

GRAVE GOODS

The grave goods were modest: a zeolite bead in grave 4 and a lip plug of rhyolite in grave 12 [see Fig. 9]. A Nile mussel shell was found on the temple of the skull from grave 13 (which was not fully explored). Traces of red dye were observed on the skull and bones [Fig. 19].

CATALOGUE OF BURIALS

A list of Neolithic burials from site KSH 1 is presented below with reference to the characteristics of the grave pit, goods and

	A	B	C		
					R
	D	E	F	G	
a					H
b					
c					
d					
e					

Fig. 11. Body positioning scheme according to E. Oldenburg and O. Mollenrop (1969: 81; after Krzyżaniak 2011: 64)

anthropologic data. When describing the position of the human remains, a scheme proposed by E. Oldenburg and O. Mollen-

rop (1969: 81; after Krzyżaniak 2011: 64), which involves marking the skeleton position with letters, was used [Fig. 11].

	Grave 1 [Fig. 12]
Depth of grave	Probably about 40–50 cm below the current surface of the site
Grave pit	No traces
Human remains	<i>Orientation:</i> E–W, head to W <i>Position:</i> Flexed, on left side; ?e <i>Gender:</i> Male <i>Age:</i> Adultus <i>Height:</i> –
General remarks	The bones are very fragmentary with very few complete elements and very little joint preservation. General surface preservation of the bones is good. The individual is generally very robust.
Pathologies/ other observations	Signs of degenerative disease were observed in the cervical and upper thoracic spine as well as on the left first metatarsal. No non-metric traits could be observed in this individual.
Dental status	–
Dental pathologies	The front teeth are very fragmented. Abscesses were present on 33, 37 and 42. 35 displays strong hypercementosis.
Goods	None

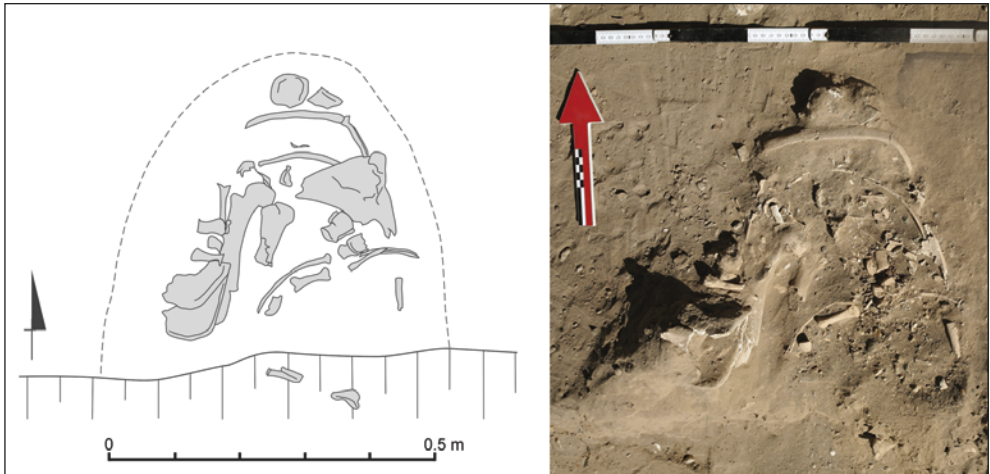


Fig. 12. Grave 1, plan and top view  
(Drawing and photo M. Jórdeczka)

## SUDAN

	<b>Grave 4 [Fig. 13A]</b>
<b>Depth of grave</b>	Around 30–40 cm below the current surface of the site
<b>Grave pit</b>	Oval, partially destroyed by the pit of grave 5 and partially by excavation for road construction
<b>Human remains</b>	<i>Orientation:</i> W–E, head towards W <i>Position:</i> Flexed, on left side; ?e <i>Gender:</i> Probably male <i>Age:</i> Adult indeterminate <i>Height:</i> –
<b>General remarks</b>	The skeletal elements are very fragmentary, surface preservation is relatively good. Joints are largely absent.
<b>Pathologies/ other observations</b>	The orbital displays strong vessel impressions potentially indicating an infectious process in the eye. Osteoarthritis was observed in the carpals of the right hand, the mandibular joint as well as the feet. The tibiae and ulnae display very strong muscle attachment sites. No non-metric traits could be observed in this individual.
<b>Dental status</b>	–
<b>Dental pathologies</b>	Teeth are very fragmented. There is severe dental calculus present on the lower molars.
<b>Goods</b>	None

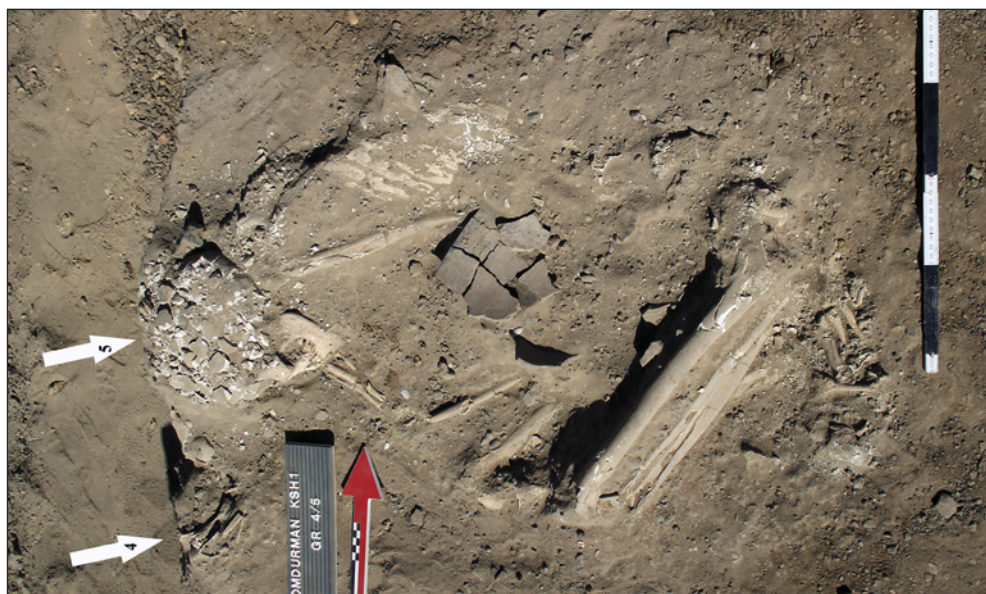


Fig. 13A. Graves 4 and 5, top view  
(Photo M. Jórdeczka)

	<b>Grave 5</b> [Figs 13A,B]
<b>Depth of grave</b>	Around 30–40 cm below the current surface of the site
<b>Grave pit</b>	Oval, size around 70 x 100 cm
<b>Human remains</b>	<i>Orientation:</i> W–E, head towards W <i>Position:</i> Flexed, on left side; Ge <i>Gender:</i> Male <i>Age:</i> 20–35 years <i>Height:</i> [160 cm]
<b>General remarks</b>	The bones are heavily fragmented, surface preservation is poor.
<b>Pathologies/ other observations</b>	The second right metatarsal possibly displays a healed fracture. Squatting facets were observed on the right tibia.
<b>Goods</b>	Barrel-shaped zeolite bead [see Fig. 9 left]

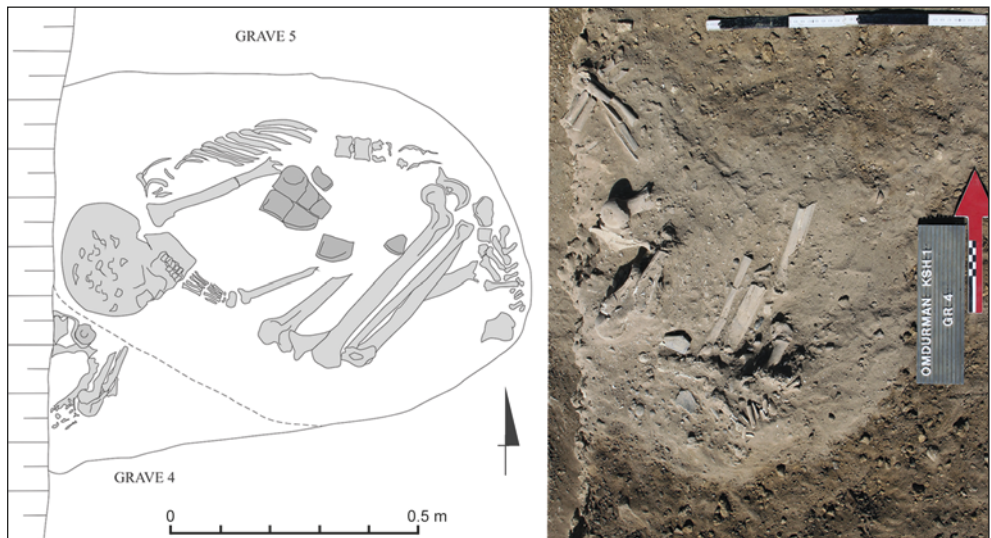


Fig. 13B. Grave 5, plan and top view  
(Drawing and photo M. Jórdeczka)

	<b>Grave 6 [Fig. 14]</b>
<b>Depth of grave</b>	Around 50 cm below the current surface of the site
<b>Grave pit</b>	Unidentifiable
<b>Human remains</b>	<i>Orientation:</i> W–E, head towards W <i>Position:</i> Flexed, on left side; Ge <i>Gender:</i> Unidentified <i>Age:</i> 1–2 years <i>Height:</i> –
<b>General remarks</b>	The bones are fragmentary and rather brittle. Surface preservation is good.
<b>Pathologies/ other observations</b>	–
<b>Dental status</b>	–
<b>Goods</b>	None

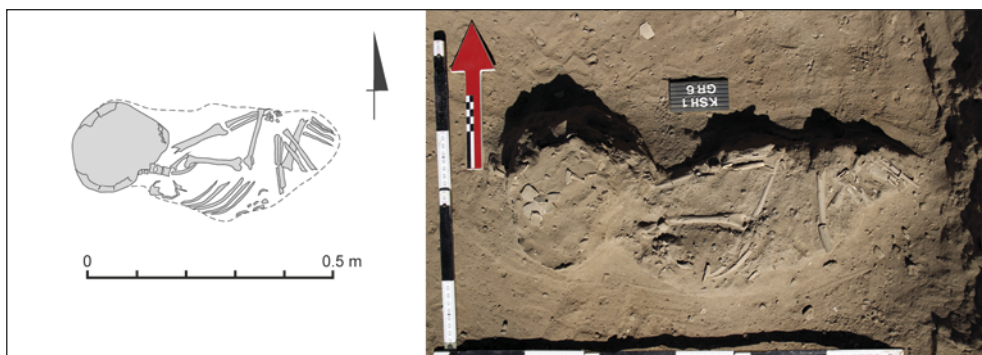


Fig. 14. Grave 6, plan and top view  
(Drawing and photo M. Jórdeczka)

	<b>Grave 7 [Fig. 15]</b>
Depth of grave	Around 40 cm below the current surface of the site
Grave pit	Unidentifiable
Human remains	<i>Orientation: W–E?</i> <i>Position: Flexed?</i> <i>Gender: Unidentified</i> <i>Age: Adultus</i> <i>Height: –</i>
General remarks	Only very few, heavily eroded long bone fragments preserved.
Pathologies/other observations	–
Goods	None

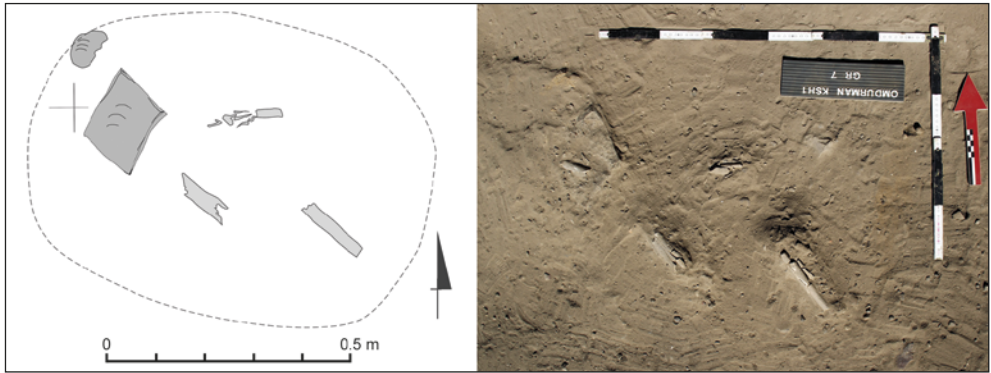


Fig. 15. Grave 7, plan and top view  
(Drawing and photo M. Jórdeczka)

	<b>Grave 9 [Fig. 16]</b>
Depth of grave	Over 1 m below the current surface of the site, exploration incomplete
Grave pit	Round
Human remains	<i>Orientation: ?</i> <i>Position: ?</i> <i>Gender: ?</i> <i>Age: ?</i> <i>Height: –</i>
General remarks	–
Pathologies/other observations	–
Dental status	–
Goods	–

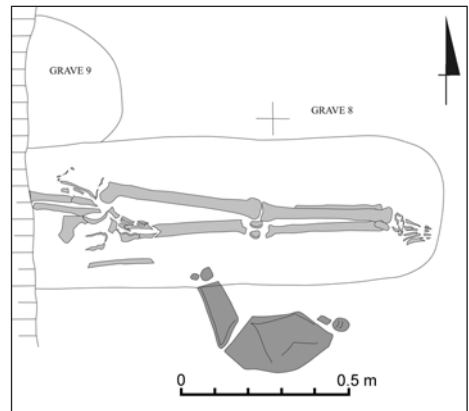


Fig. 16. Grave 9, plan  
(Drawing M. Jórdeczka)

## SUDAN

	<b>Grave 11 [Fig. 17]</b>
<b>Depth of grave</b>	Around 50 cm below the current surface of the site
<b>Grave pit</b>	Unidentifiable
<b>Human remains</b>	<i>Orientation:</i> W–E <i>Position:</i> Flexed?, on right side; Ge? <i>Gender:</i> Female <i>Age:</i> Adult indeterminate <i>Height:</i> –
<b>General remarks</b>	–
<b>Pathologies/ other observations</b>	Strong vessel impressions in the right orbit indicate an infectious process in the eye. A healed fracture is present on the distal joint surface of one mid phalanx. Evidence for severe osteoarthritis was observed in cervical spine.
<b>Dental status</b>	–
<b>Dental pathologies</b>	Teeth are generally very fragmentary. There is abnormal attrition on the front teeth with heavy attrition on the lingual side. Moderate calculus is present on some of the maxillary teeth.
<b>Goods</b>	None

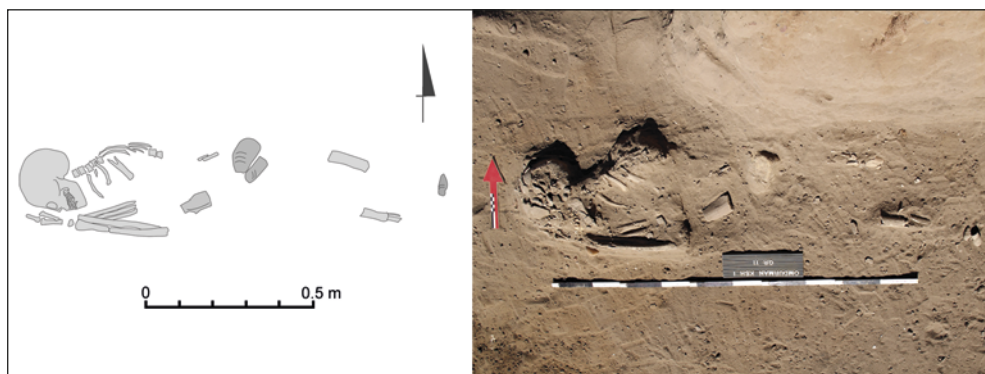


Fig. 17. Grave 11, plan and top view  
(Drawing and photo M. Jórdeczka)



	<b>Grave 12</b> [Fig. 18]
<b>Depth of grave</b>	Around 70–80 cm below the current surface of the site, partially destroyed by excavation for road construction
<b>Grave pit</b>	Oval, around 70–100 cm
<b>Human remains</b>	<i>Orientation:</i> W–E <i>Position:</i> Flexed, on right side; Ge <i>Gender:</i> Female <i>Age:</i> 17–25 years <i>Height:</i> –
<b>General remarks</b>	The individual is relatively well preserved, however the surfaces are partly eroded and skeletal elements are very fragmentary. The skull is missing.
<b>Pathologies/ other observations</b>	Slight osteophyte formation is observed in the thoracic bodies and costal facets, but no signs of osteoarthritis. All other joints are in good condition. Squatting facets are present on the right talus and distal tibia.
<b>Dental status</b>	–
<b>Dental pathologies</b>	Slight dental calculus is present on the front teeth. The premolars display dental enamel hypoplasias.
<b>Goods</b>	So-called lip plug made of rhyolite [see Fig. 9 right]

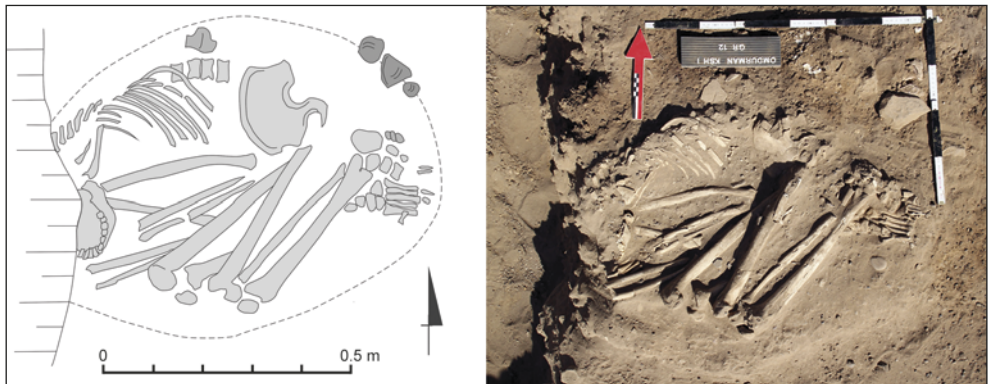


Fig. 18. Grave 12, plan and top view  
(Drawing and photo M. Jórdeczka)

	<b>Grave 13 [Fig. 19]</b>
<b>Depth of grave</b>	Around 80–130 cm below the current surface of the site; not explored
<b>Grave pit</b>	Round, around 60 cm diameter
<b>Human remains</b>	<i>Orientation:</i> E–W ? <i>Position:</i> Flexed, on left side <i>Gender:</i> – <i>Age:</i> – <i>Height:</i> –
<b>General remarks</b>	–
<b>Pathologies/ other observations</b>	–
<b>Dental pathologies</b>	–
<b>Goods</b>	Shell of Nile mussel placed on the temple, body covered with ocher



*Fig. 19. Grave 13, top view  
(Photo M. Jórdeczka)*

LIST OF MEROITIC/  
POST-MEROITIC GRAVES

Differing significantly from the Neolithic burials presented above are graves, probably Meroitic or post-Meroitic, in which the dead were placed in rectangular pits, in an extended position on the

back, with a slight tilt to the left and head directed W or SW. One or more, most often large, flat stones lay next to the right hip of the body. These graves had no goods.

	<b>Grave 2 [Fig. 20]</b>
<b>Depth of grave</b>	Around 40–50 cm below the current surface of the site, partly destroyed by excavation for road construction
<b>Grave pit</b>	Approximately rectangular, embedded in sterile earth
<b>Human remains</b>	<i>Orientation:</i> SW–NE, with head towards SW <i>Position:</i> Extended, slight on left side; Da <i>Gender:</i> Female <i>Age:</i> 25–35 years <i>Height:</i> [159 cm]
<b>General remarks</b>	The remains are very fragmentary, medium surface preservation. There are very few joint surfaces preserved.
<b>Pathologies/ other observations</b>	The preserved joints are in good condition without any signs of osteoarthritis. No non-metric traits could be observed in this individual.
<b>Dental status</b>	–
<b>Dental pathologies</b>	Teeth are very fragmented. There is severe dental calculus present on the lower molars.
<b>Goods</b>	–



Fig. 20. Grave 2, plan and top view  
(Drawing I. Sobkowiak-Tabaka, M. Jórdeczka; photo M. Jórdeczka)

## SUDAN

	<b>Grave 3 [Fig. 21]</b>
<b>Depth of grave</b>	Around 40–50 cm below the current surface of the site
<b>Grave pit</b>	Approximately rectangular, embedded in sterile earth
<b>Human remains</b>	<i>Orientation:</i> E–W, head towards W <i>Position:</i> extended, slightly on left side; Da <i>Gender:</i> Male <i>Age:</i> Adult indeterminate <i>Height:</i> [168 cm]
<b>General remarks</b>	The remains are fragmentary with relatively well preserved surfaces.
<b>Pathologies/ other observations</b>	Osteoarthritis was present in the right elbow, the distal phalanges of the feet, the cervical spine and the costo-vertebral joints. The right ulna was fractured during lifetime at the distal end. The maxillary sinus shows evidence of a healed infection. There are very strong muscle markings on the tibiae.
<b>Dental status</b>	Dental enamel hypoplasia present on the upper teeth indicates nutritional deficiencies or a long standing disease process during childhood.
<b>Dental pathologies</b>	Moderate dental calculus is observable on the maxillary teeth. Chipping is noticeable on the front teeth, hypercementosis was observed on the upper M3.
<b>Goods</b>	–

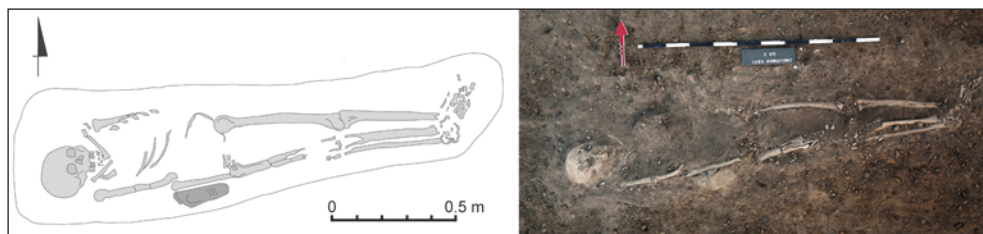


Fig. 21. Grave 3, plan and top view  
(Drawing I. Sobkowiak-Tabaka, M. Jórdeczka; photo M. Jórdeczka)

	<b>Grave 8</b>
<b>Depth of grave</b>	Around 80 cm below the current surface of the site
<b>Grave pit</b>	Approximately rectangular, embedded in sterile earth, cut in half by excavation for road construction
<b>Human remains</b>	<i>Orientation:</i> E–W, head towards W <i>Position:</i> Extended, slightly on right side; Da <i>Gender:</i> Female <i>Age:</i> Adult indeterminate <i>Height:</i> [160 cm]
<b>General remarks</b>	Skeletal elements are very fragmentary. Bone surfaces are partly eroded.
<b>Pathologies/ other observations</b>	Osteoarthritis could be observed in both wrists, hands and the patellae. A healed fracture was present in the left ulna. No non-metric traits were preserved in the skeleton.
<b>Goods</b>	–

	<b>Grave 10</b> [Fig. 22]
<b>Depth of grave</b>	Around 80 cm below the current surface of the site
<b>Grave pit</b>	Oval, approximately rectangular, embedded in sterile earth, cut in half by excavation for road construction
<b>Human remains</b>	<i>Orientation:</i> SE–NW, head towards NW <i>Position:</i> Extended, slightly on right side; Da <i>Gender:</i> Male <i>Age:</i> 15–18 years <i>Height:</i> –
<b>General remarks</b>	–
<b>Pathologies/ other observations</b>	–
<b>Dental status</b>	–
<b>Goods</b>	–



Fig. 22. Grave 1, plan and top view  
(Drawing I. Sobkowiak-Tabaka, M. Jórdeczka; photo M. Jórdeczka)

## CHRONOLOGY

The chronology of the settlement and cemetery at the site was determined on the basis of an initial analysis of ornamented ceramics, grave forms, as well as analogy to other Neolithic cemeteries in northeast Africa. Rectangular graves, in which the dead were placed in an extended position and did not contain any goods, should be associated with an earlier period of settlement on the site, probably the early Meroitic period (M. El-Tayeb and Mahmud Suleiman al Bashir, personal

communication).<sup>6</sup> Graves in oval or round shape, in which the dead were placed in a flexed position, are typical of the Neolithic period. An attempt to mark bones from the respective grave types using radiocarbon dating proved unsuccessful. A single dating result for grave 6 was however obtained: 5300±40 BP (Poz-53333), qualifying it as Neolithic from a formal point of view.

Flint assemblages are also typical for the time period and are based above all on

<sup>6</sup> We are indebted to Dr. Mahmoud El-Tayeb and Mahmud Suleiman al Bashir for sharing this information.

quartz materials and fewer chert pebbles or quartzite sandstone pieces. A few segment samples were also discovered among small tools. Discoveries from the site surface are interesting: an axe probably made from chert, pebbles from the Nile deposits

and a chisel made of hippopotamus bone. Unfortunately, no artifacts tied to the Meroitic period when the site (cemetery) was used, could be found in the archeological material from the cultural layer or the respective features.

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