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Holocene stratigraphies and sediments on Mograt Island (Sudan) – The second season of the Late Prehistoric Survey 2014/15

1. Introduction

As a sub-project of the Mograt Island Archaeological Mission, the Late Prehistoric Survey[1] is dedicated to the investigation of late prehistoric sites and their specific environments on Mograt Island. This approach aims to reconstruct the past insular landscapes as settings of human-environmental interaction and how they changed during the course of the Holocene. The Late Prehistoric Survey continued its fieldwork in the season 2014/15 comprising different research activities:[2]

(1) excavation: clearing of sections and test excavations at 6 sites which had been recorded during the previous field season in western Mograt (MOG086, MOG102, MOG105, MOG106, MOG114, MOG116; cf. fig. 1, tab. 2)[3]
(2) geoarchaeology: soil and OSL sampling at excavated trenches, survey in the vicinity of sites, laboratory analysis[4]
(3) surveying: continuation of the survey at western and central Mograt with 16 new sites being recorded
(4) knapping experiment: testing local raw materials with respect to different knapping strategies and pre-treatment.

2. Excavations

2.1. Stratigraphies at Nile terraces

MOG107 (Hajar al-Nur, 'the lake site')
After the clearing and the documentation of the early Holocene lake section (MOG107; fig. 2) during the previous season it was decided to return to the site to complete the recording with more detailed soil studies. From the stratigraphical observations two distinct phases of sedimentation were evident and could be roughly associated with the early Holocene and the Pleistocene or earlier periods.[5] Sandy silts of stillwater sediments dated to the 10th and 9th millennia calBC rested on gravels and sands that contained few rolled palaeolithic artefacts (fig. 2). During the 2014/15 season altogether six duplicate samples for both producing thin sections for studying soil micromorphology and carrying out geochemical analysis (tab. 1), as well as three OSL samples, were taken.

The thin sections have been analysed at the Charles McBurney Laboratory for Geoarchaeology (University of Cambridge). They provide information on a number of processes. The lower portion of the stratigraphy consists of heterogeneous gravels, sands and silts (tab. 1: samples 3–6). This situation is interpreted as the weathering of the local Oligocene limestone geology[6] along with the episodic deposition of fluvial gravels and windblown material. At some point, these sediments have been entirely cemented with calcium carbonate. These events predate the Holocene period and may partly be correlated to dune formation processes during the late Pleistocene as observed elsewhere in Sudan.[7] Volcanic tephra mainly in the form of pumice was seen throughout the thin section deriving from the

1 For previous prehistoric research on Mograt Island cf. Dittrich and Geßner 2014. For general information on the project visit www.mogratarchaeology.com.
2 The Late Prehistoric Survey 2014/15 was conducted from 24th November 2014 to 6th January 2015. The team consisted of Dr Annett Dittrich (archaeologist, freelance for Humboldt University of Berlin), Kerstin Geßner (archaeologist, freelance for Humboldt University of Berlin), Dr Sayantani Neogi (geo-archaeologist, Charles McBurney Laboratory, Cambridge), Dr Maciej Ehlert (archaeologist, freelance for Humboldt University of Berlin) and Hassan Mustafa Alkhidir Ahmed (inspector, National Corporation for Antiquities and Museums, Khartoum).
3 Dittrich and Geßner 2014: tab. 1.
4 Soil samples for micromorphological and geochemical analysis have partly been transferred to the Charles McBurney Laboratory, Cambridge. Analysis has been carried out by S. Neogi, Cambridge.
5 Dittrich and Geßner 2014: 138–139, fig. 16, tab. 2.
6 In the thin sections, limestone rock and shell fragments were observed. Presently, such formations are dated to the Oligocene in Sudan (Whiteman 1971; Medani 1972).
7 Williams 2009.

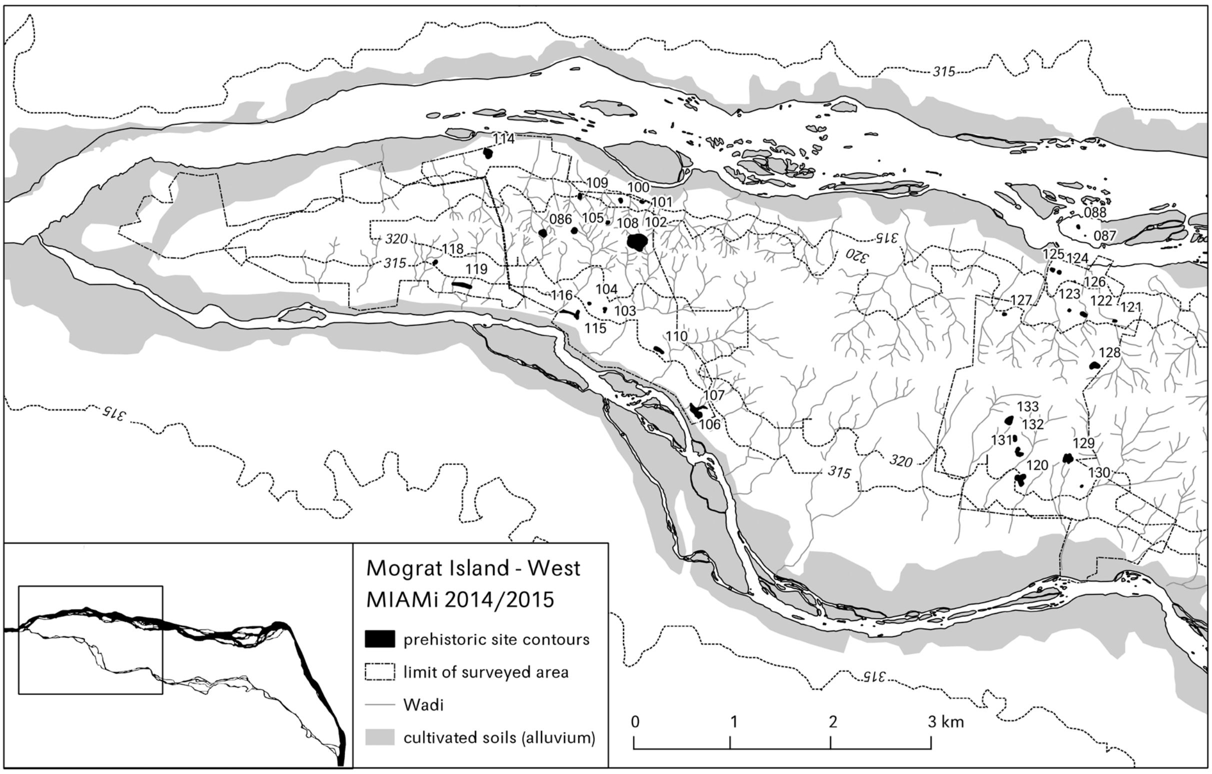


Fig. 1: Mograt Island, western part. Site contours and limits of surveyed areas as completed by the season 2014/15 (map: A. Dittrich)

Sample Number	Depth (cm) from top	pH value	Electronic Conductivity (ms/cm)	Magnetic Susceptibility (SI)	Particle size analyses			Loss-on-ignition		
					% Sand	% Silt	% Clay	% Organics	% $CaCO_3$	% Mineral
MOG107 Profile 2										
1	145–151	8.73	3.48	418.8	38.6	57.6	3.8	8.0	4.5	87.5
2	172–179	7.99	10.14	227.7	7.6	83.1	9.3	10.2	3.0	86.8
3	195–203	8.38	1.71	90.0	58.6	39.1	2.3	2.0	0.5	97.5
4	243–250	8.24	3.00	67.9	66.6	29.8	3.5	1.7	0.3	98.0
5	265–277	9.49	0.99	82.8	55.2	41.0	3.9	2.4	0.6	96.9
6	320–327	8.88	2.40	26.1	40.4	55.6	4.0	3.0	0.6	96.4
MOG105 Section S										
3	40–48	7.77	30.00	74.6	35.0	59.4	5.6	5.5	15.6	78.9
2	65–73	7.56	33.00	41.7	26.6	68.2	5.2	6.4	19.9	73.7
1	70–78	7.72	36.16	22.2	26.9	65.7	7.4	4.2	27.2	68.6

Tab. 1: Geochemical analysis of soil samples from the early Holocene lake site MOG107 and the inland waterpond sediments of site MOG105

site code	method	exc. area	lithics	pottery	bones	stone artefacts*	other
MOG086	trench 1 (ABCD scheme)	4 m²	936	86	139 g	6	
MOG102	trench 1 (ABCD scheme)	4 m²	1,764	444	484 g	4	2 ostrich eggshell beads, eggshell work pieces
MOG105	trench 1 (ABCD scheme + extension to 5 m section)	4 + 3 m²	565 (+ 634)	87 (+ 57)	95 g	3	2 and a half ostrich eggshell beads
MOG106	trench 1 (3 sections, 16 squares)	16 m²	4,212	45	692 g	1	
MOG106	trench 2 (ABCD scheme)	4 m²	3,287	54	9 g	1	
MOG114	trenches 1–3 (ABCD scheme)	3 x 4 m²	764 (1); 1,348 (2); 163 (3)	93 (1); 8 (2); 15 (3)	33 g	1	
MOG116	clearing of section and planum 1	9 m²	2,564	115	271 g	2	0.35 kg lumps of burnt clay
MOG116	removal of layer 1 (planum 1-2)	2.4 m²	9,658	332	1,638 g	28	2 kg lumps of burnt clay

Tab. 2: Mograt Island. Investigated sites and general find statistics of the season 2014/15 (*includes grinding and hammer stones)

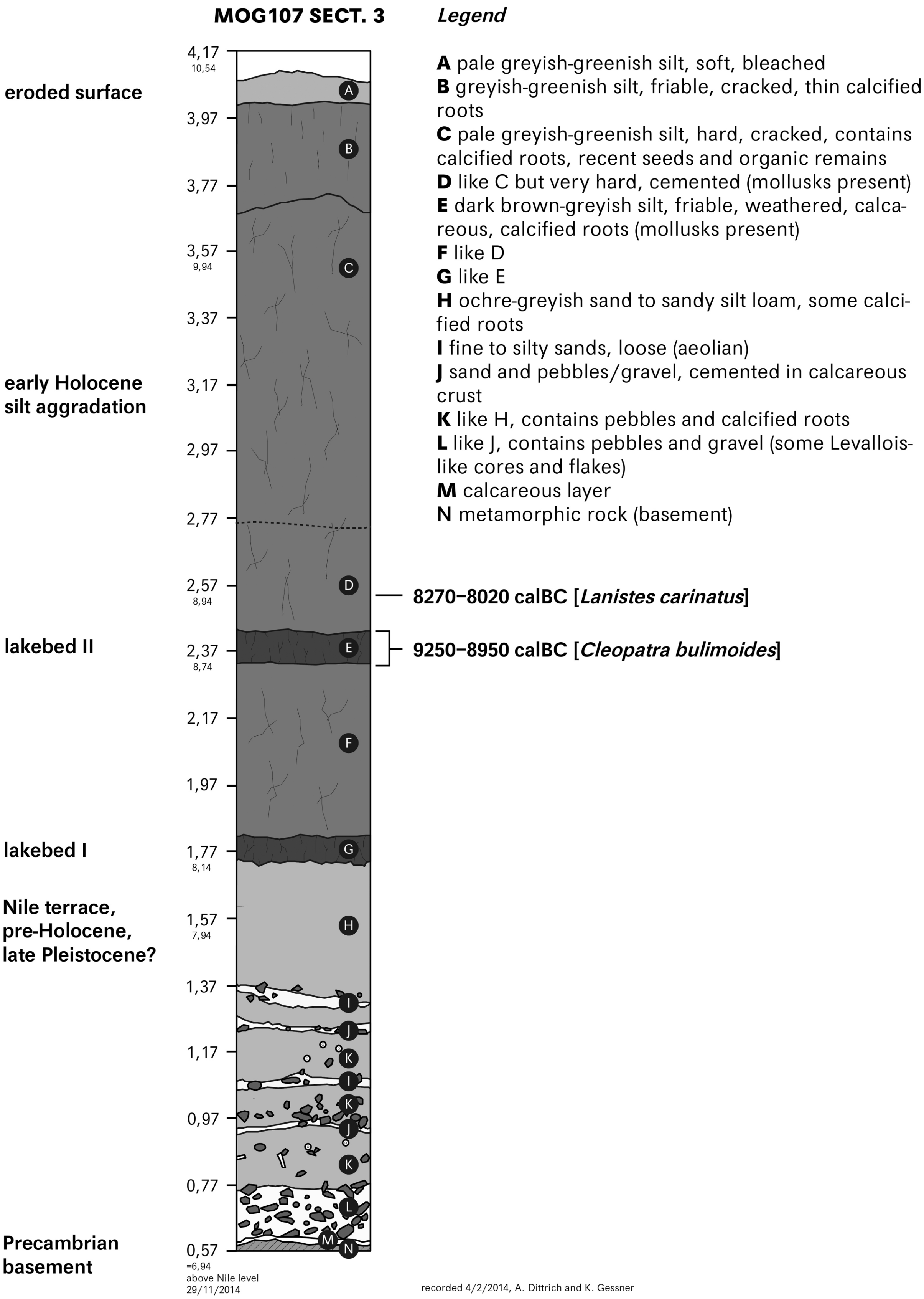


Fig. 2: MOG107. Holocene lake stratigraphy as recorded during the previous season (field recording: A. Dittrich/K. Geßner; drawing: A. Dittrich)

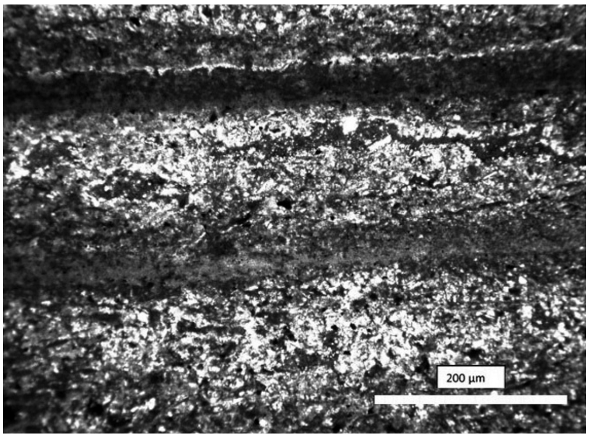


Fig. 3: MOG107. Horizontal laminations reflecting deposition in water were observed throughout the upper layers (photo: S. Neogi)

lowest part. Its occurrence is probably connected to the activity of the Bayuda volcanic field.

The thin sections coming from the upper part of section indicate a lithological discontinuity (tab. 1: samples 1–2). Horizontally laminated silts, identified mainly as quartz, mica and tourmaline, are interpreted as the result of repetitive flooding events and water logging conditions (fig. 3). Due to extensive bioturbation of sediments, organic matter has frequently been found. It can be assumed that soil fauna was most active between the flooding events when the sediments had dried out. Soil formation processes seem to have been well underway. This is suggested by limpid clay coatings[8] of particles which are characteristic of stable and densely vegetated land surfaces.

Embedded within the silts a relatively thin dark brown layer has been sampled separately (tab. 1: sample 2). It is characterised by very high silt and organic contents. Bioturbation of the layer had been intense. As post-depositional events, the redoximorphic features such as iron mottles indicate a fluctuating water table later followed by the drying-up which led to the subsequent precipitation of calcium carbonate.[9] This layer has been interpreted as a lakebed which was further suggested by the inclusion of mollusk shells (cf. fig. 2E).

MOG106 (Hajar al-Nur, 'the settlement site')

Neighbouring the stratigraphy of MOG107, site MOG106 is located approximately 100 metres north of the southern Nile branch and was first recorded and test-excavated in 2014.[10] This test square (37/14) revealed a very high amount of finds, the concentration of which was assumed to be a result of the deflation of former top soils.

The axis of the new trench 1 was set up over a distance of 41 metres (squares 39/00 to 39/41) to cut a section through the mound on which the majority of surface finds is resting. Along with the test square, four sections along this axis were excavated comprising altogether 17 squares with an area of 1m² each (figs. 4, 6). Sediments were sieved and all finds (tab. 2) were counted and divided according to statistically relevant levels of 10cm. The aim of the excavation was to trace a potential connection to the silty strata of the adjacent Holocene palaeolake (MOG107) on the northern side (fig. 5) and to the more recent alluvial and aeolian sediments at the southern site margins (fig. 7). In other words, the aim was to understand the relation between the former lake and the habitation site in terms of a spatial preference such as the occupation of a shoreline in proximity to aquatic resources.

At the lakeside end of trench 1 (squares 39/39–39/41), the two lakebeds of the adjacent site MOG107[11] were identified again; their stratigraphy could be linked to the lake basin sloping northwards from the shoreline at sector 39/39 (fig. 6). Combining the evidence of the four sections, the settlement mound could be shown to have been part of an older Nile terrace of probably Pleistocene age which consists of calcified sandy silts and pebble layers resting on the local basement. If indeed the early Holocene lake and the supposed shoreline settlement existed at the same time, more than 1.5m of top soils and deposits[12] at the settlement area must have disappeared since the Holocene habitation due to deflation. In archaeological terms, the supposed link cannot be proven as sediments and therefore stratigraphical units are missing.[13] In fact, only the bedrock ultimately delimiting the lakeshore as well as the hard and clay-cemented sediments were preserved and exempted from later erosion. Besides that, numerous artefacts and fossilised bones formerly included within the eroded soft sediments were left on the surface of the older terrace. They were inter-

8 These features are formed through the percolation of water through the soil profile carrying very fine clay particles in slightly acidic conditions (Fedoroff et al. 2010; Kühn et al. 2010).

9 Lindbo et al. 2010.

10 Dittrich and Geßner 2014: 142, tab. 1.

11 Dittrich and Geßner 2014: 138–139, fig. 16.

12 Sediments of this minimum height were required to actually establish the lake shoreline and to prevent water of the lake from draining onto the alluvial plain.

13 The counting and processing of finds according to supposed 'archaeological units' or 'cultural layers' is of no relevance in this case.

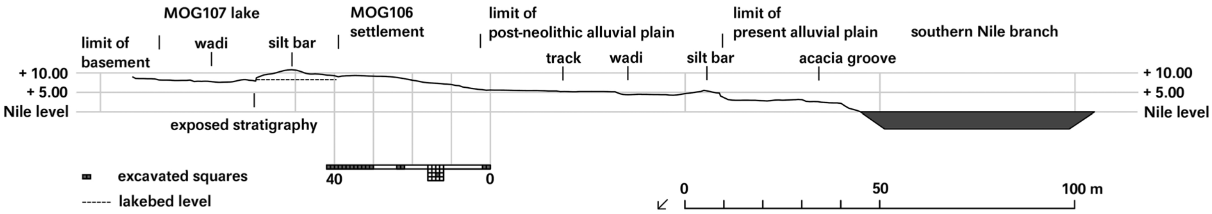


Fig. 4: MOG106, SE section. Elevation of the site in relation to MOG107 (the lake site) as well as to the present southern Nile channel (field recording/mapping: K. Geßner, A. Dittrich)

Fig. 5: MOG106, trench 1. Overview of the excavation exposing early Holocene silts (in front) and the older basement and terrace (centre) on which the occupational remains are resting, note the disturbance due to machine use probably in quest for gold (centre, left; photo: A. Dittrich)

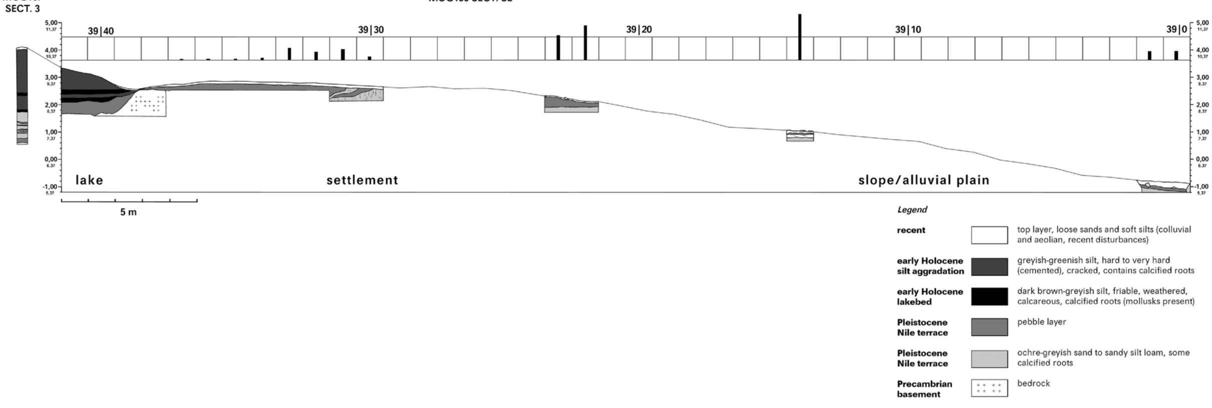


Fig. 6: MOG106, SE section. Trench 1 in relation to the absolute height of the stratigraphy at the neighbouring site MOG107 (left), the amount of lithic finds per square is indicated in the statistics given above (field recording: A. Dittrich, K. Geßner, M. Ehlert, H. M. Alkhidir Ahmed; drawing: A. Dittrich)

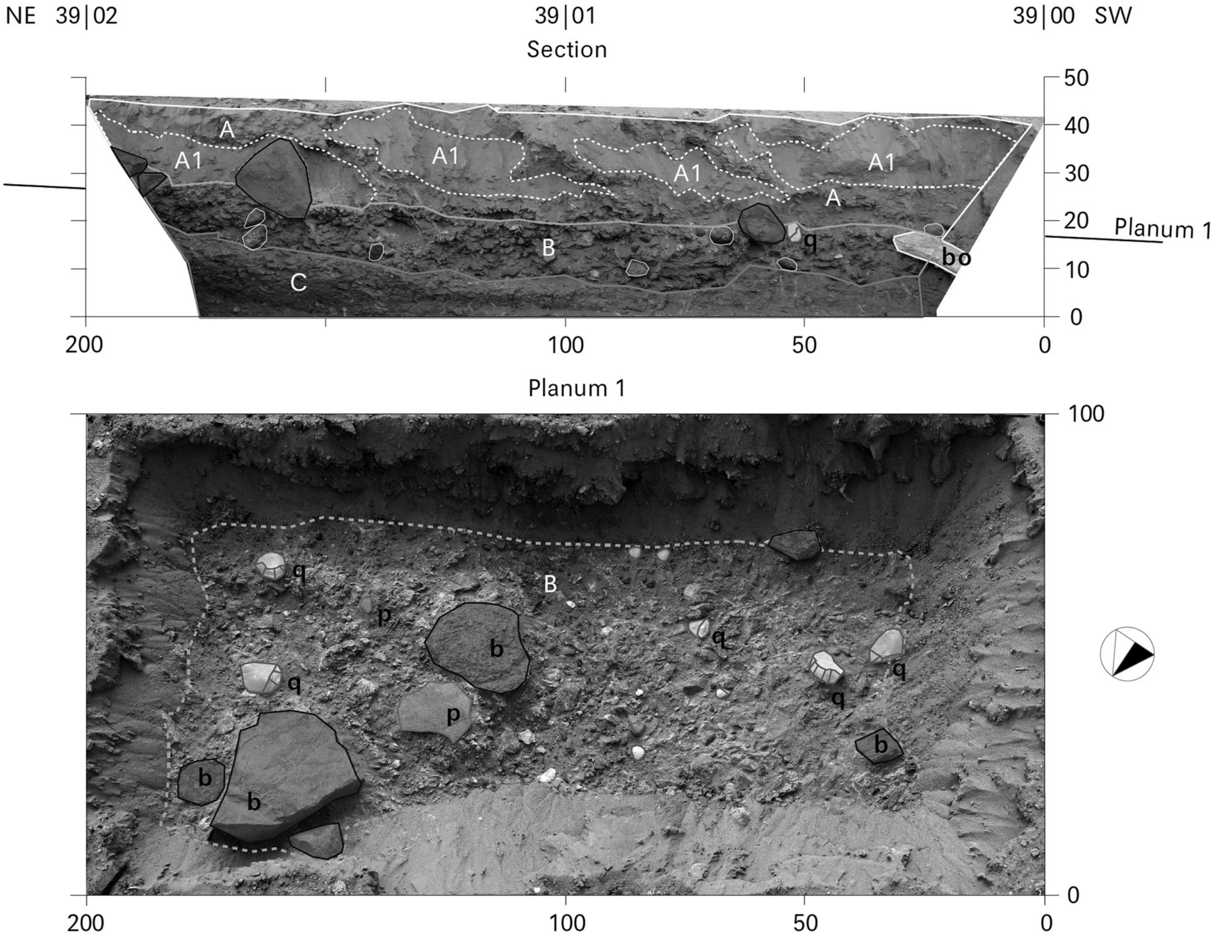


Fig. 7: MOG106, SE section/planum 1. Detailed record of squares 39/00 and 39/01 exposing a sequence of different depositional events (A: post-neolithic floods/colluvium with recent aeolian deposits (A1); A/B boundary: basement stone slabs and cobbles (b), quartz cores (q), bones (bo) and pottery fragments (p) of a mid-Holocene occupation; B: colluvial pebble layer containing earlier mesolithic finds; C: clay-cemented silts of the Pleistocene (?) Nile terrace (field recording/drawing: A. Dittrich)

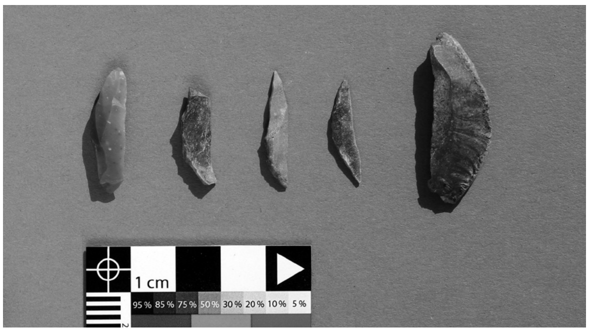


Fig. 8: MOG106. Backed points made from chert (photo: A. Dittrich)

mingled with more recently deposited aolian sands and washed-down silts down to a depth of c. 30cm.

The great technological variety of the surface finds suggested that the site was occupied during different Holocene periods. Through excavation of trench 1 a significant sample of lithics has been obtained for more detailed studies (tab. 2). It was only at the foot of the slope (squares 39/00 and 39/01) that indications of a stratigraphical order of artefacts were observed (fig. 7) even though they were embedded in a colluvial environment. The upper layer contained large pieces of rocker stamped pottery, cobble stones and prismatic quartz cores, comparable to the stratified find layer of site MOG116 (see below). By contrast, the lower layer contained small blades and microlithic implements made from chert. Chert artefacts and blades were also frequent at the middle part of the slope (squares 39/22 and 39/23), where they had most probably weathered out of an older layer (fig. 8). The two different lithic strategies could signify two different general subsistence strategies, changing from a lakeshore occupation during the early Holocene to a Nile terrace occupation during the mid-Holocene[14] after the lake had dried up. The

14 The terminus mid-Holocene is used here to refer mainly to the period of the 6th and 5th millennia BC which comprises both the transition from the Mesolithic to the Neolithic as well as the proper Neolithic in the Middle Nile valley (cf. Dittrich 2011, 2015).

Group	Species	MOG086	MOG102	MOG105	MOG106	MOG114	MOG116	MOG120	MOG124
Fishes	Catfish *(Synodontis sp.?)*	1		2					
	Pisces indet.						1		
Reptiles	Nile crocodile *(Crocodylus niloticus)*		2				1		
	Nile monitor *(Varanus niloticus)*		1?	1?					
	Reptilia indet.		2						
Birds	Ostrich *(Struthio camelus,* eggshell fragm.*)*		1						
	Aves indet.		1						
Mammals	Dorcas gazelle *(Gazella cf. dorcas)*	1		1					
	Gazella sp.	2	1				1		
	Bovidae indet., medium	2		1	2		2		
	Bovidae indet., large		2		7		2		
	Perissodactyla indet.		1						
	Warthog *(Phacochoerus africanus)*					1			
	Suidae indet.	1							
	Hippopotamus *(Hippopotamus amphibius)*				2		3		1
	Mammalia indet., small	1					1		
	Mammalia indet., medium	3	9	2	3		1		
	Mammalia indet., large		6	2	2	2	3		
	Mammalia indet., very large	3		1	4		3		2
	Mammalia indet.	2	2	3	1	1			
Human	Human *(Homo sapiens)*			1				2	

Tab. 3: Mograt Island. Preliminary identifications of vertebrate remains (NISP) from excavated and surveyed sites (season 2014/15)

fossilised and fibrous animal bones of which only larger specimens and massive parts were preserved have been preliminarily identified[15] as belonging to medium to large bovidae or mammalia and to hippopotamus in two cases (tab. 3).

Since the southeastern part of the site is divided from the main mound by a small *khor*, a second trench was laid out as a test trench[16] to compare the situation as well as the structure and density of finds to trench 1. The surface in this area consists of hammada instead of silts. Most of the finds and the basement gravels found in the lower layers showed traces of a very hot fire in place. Sterile soil was not reached by the test trench scheme but the number of finds seems statistically sufficient to be compared to those of trench 1 (tab. 2).

MOG116 (Gharghara)

Site MOG116 had also been recorded during the previous season. It consisted of a loose surface find concentration and, most interestingly, a long natural section exposed by the activity of a wadi. The section provides an extensive Quaternary record resting on the Precambrian basement (fig. 9). The site is situated approximately 215m inland of the present southern Nile channel (fig. 10).

In the current season, the study of MOG116 was given priority since the local landowner had intended to bulldoze the silt deposits of the site to create a new terrace for plant cultivation. In preparation for this, stones and artefacts had already been removed from the site's surface and discarded nearby when the

15 The faunal identification was carried out by N. Nolde, Cologne.

16 The test trench scheme comprises the layout of a 2 × 2m trench divided into four squares named A, B, C and D. While A is left untouched, at B the surface materials are removed, C is excavated down to 10cm and D is excavated to 20 cm. The four plana are photographed together to document the degree of deflation and the transition from detached surface finds to embedded finds that would not be visible in a section due to the very low thickness of the upper strata. The ABCD scheme is open to any kind of extension according to the realities of a given site and its deposits.

Fig. 9: MOG116, SE section. Overview of the section and the cleared stony surface of the mid-Holocene occupational layer (in front), note the effects of bulldozing in the background (photo: A. Dittrich)

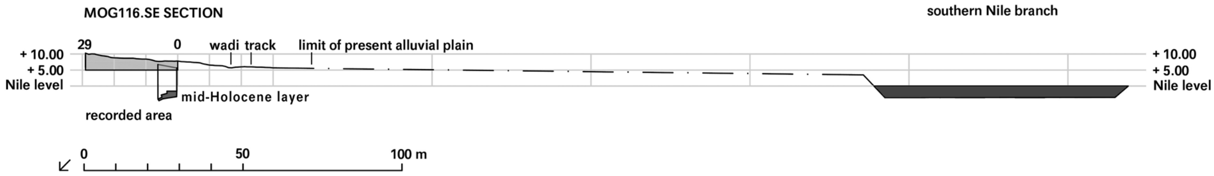


Fig. 10: MOG116, SE section. Elevation of the site in relation to the present southern Nile channel (field recording/mapping: K. Geßner, A. Dittrich)

Fig. 11: MOG116. Clearing of the occupational layer covered by thick alluvium (photo: A. Dittrich)

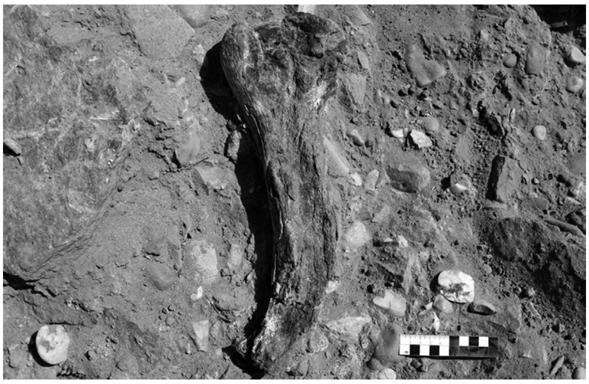


Fig. 12: MOG116. Hippopotamus humerus as found during clearing (photo: A. Dittrich)

Fig. 13: MOG116. Wrapping and labeling of soil samples taken from the stratigraphy (photo: A. Dittrich)

team arrived. It was negotiated between the NCAM inspector and the landowner that part of the section and the site would be left intact for archaeological investigation.

In the course of the present excavation, the SE section along the wadi passage was cleared at a total length of 24m. During the cleaning an artefact-rich mid-Holocene layer varying in thickness between 10 and 20cm was found (figs. 9, 11, 14). As the layer slopes significantly towards the direction of the southern Nile branch, more recent alluvium has later been deposited on top of it, reaching a thickness of up to 2m in the area currently excavated. In the

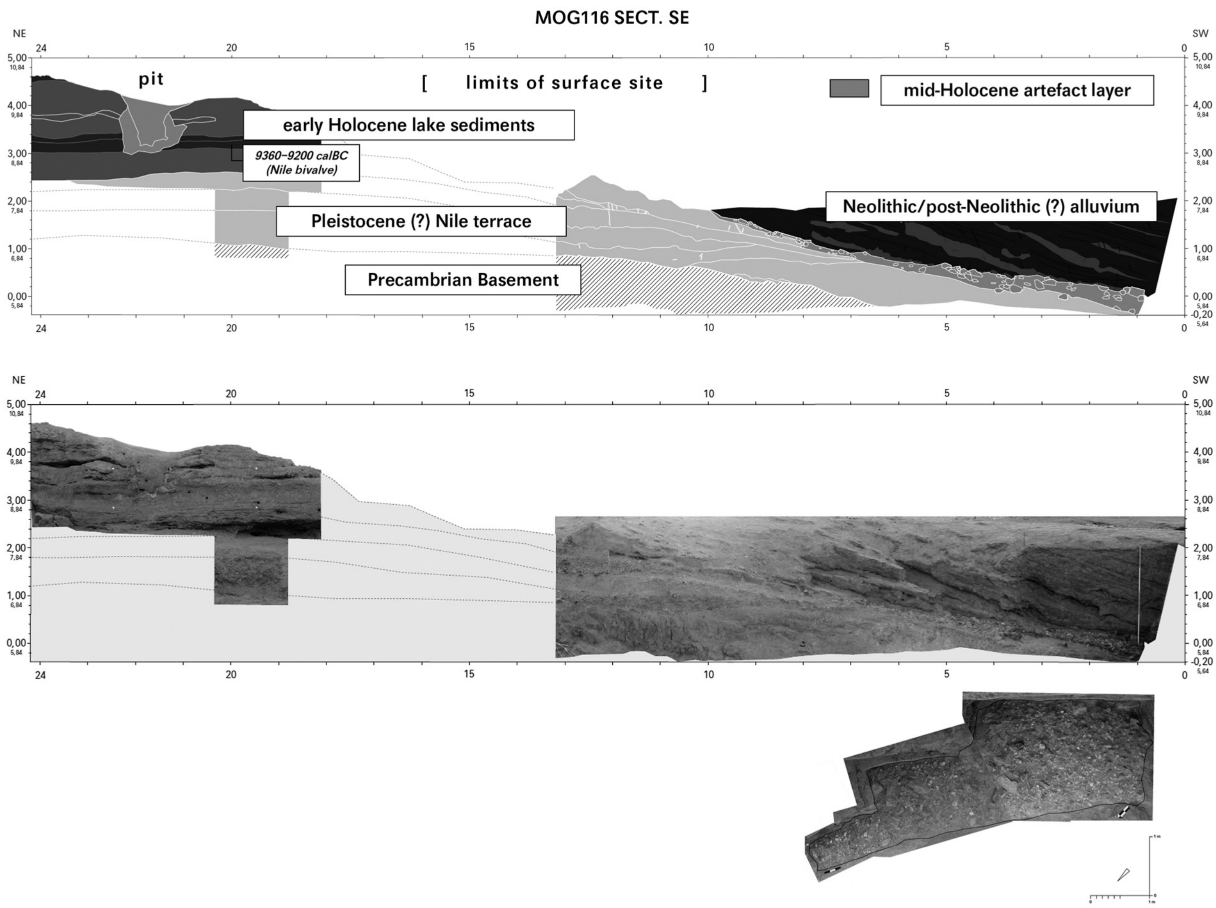


Fig. 14: MOG116. Orthophotographical record of the SE section and planum 1, above: chrono-stratigraphical interpretation (field recording: A. Dittrich, K. Geßner; drawing: A. Dittrich)

site/ sample no.	material/ species	context	height above local NN	lab no.	conventional 14C age	calibrated 14 C age (1st sigma)	calibrated 14 C age (2nd sigma)
MOG105-25-2-2	shell of *Pila* sp. (mature, large)	trench 1, extension (grey sediment)	-0.10–0.80 m	Poz-72519	6440 ± 40 BP	5471–5376 calBC	5479–5331 calBC
MOG105-24-6-1	shell of *Lanistes* sp. (immature)	trench 1, sq. C, pl. 0–10 cm	-0.10 m	Poz-72516	6540 ± 40 BP	5530–5476 calBC	5613–5386 calBC
MOG105-24-8	ostrich eggshell bead fragment (*Struthio camelus*)	trench 1, sq. D, pl. 0–10 cm	-0.10 m	Poz-72515	6650 ± 40 BP	5623–5554 calBC	5639–5511 calBC
MOG105-25-2-1	shell of *Bellamya unicolor* (?)	trench 1, extension (grey sediment)	-0.10–0.80 m	Poz-72518	7190 ± 40 BP	6075–6013 calBC	6205–5989 calBC
MOG105-24-6-2	shell of *Zootecus insularis*	trench 1, sq. C, pl. 0–10 cm	-0.10 m	Poz-72517	8060 ± 50 BP	7123–6836 calBC	7176–6815 calBC
MOG116-35-2	shell of Nile bivalve (indet.)	SE section, m 20	3.33 m	Poz-72520	9800 ± 50 BP	9297–9246 calBC	9360–9200 calBC

Tab. 4: Mograt Island. Radiocarbon dates for shells from MOG105 and MOG116 (season 2014/15)

middle parts of the section, finds had weathered out of the stratigraphy which at first gave the impression of a mere surface site.[17] To the north, a pit excavated from the surface level down to a maximum depth of 1.2m was exposed by the section (fig. 14). Its walls had been lined with clay which had been burned red through exposure to a high-temperature fire. The pit cut through silty sediments that contained two lakebed horizons, the absolute levels of which closely resemble those of site MOG107. A Nile bivalve shell found in the lower one gave a date of about 9300 calBC (tab. 4) which further suggests a lake formation event similar to that recorded at MOG107.[18] Since unfortunately a significant dis-

17 From the stratigraphical observation it can be suggested that the largest portion of the site is still deeply buried underneath the more recent silts and will thus remain preserved.

18 Dittrich and Geßner 2014: tab. 2.

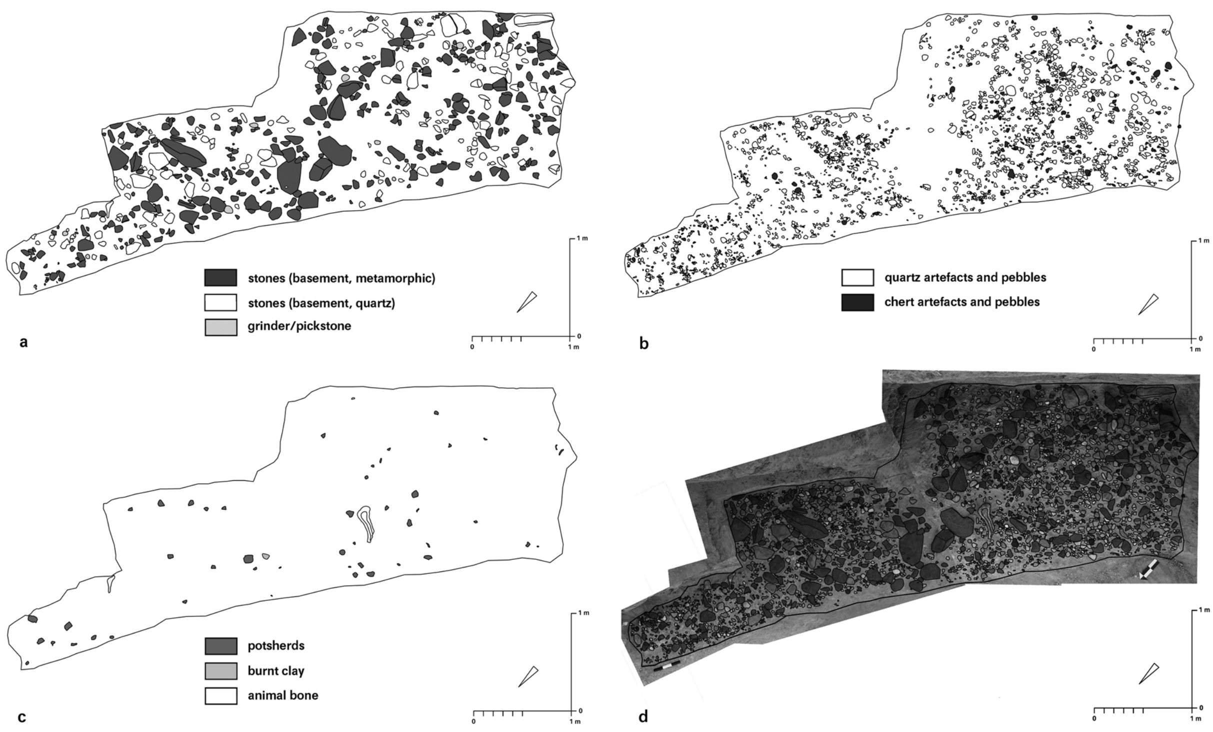


Fig. 15: MOG116, Planum 1. Orthophotographical record (lower row, left) and CAD based tracing of different artefact/ecofact classes (field recording: H. M. Alkhidir Ahmed, M. Ehlert; mapping: K. Geßner, A. Dittrich)

cordance occurred in the central area of the stratigraphy due to erosion (cf. fig. 14), the chronological link between the pit and the stratified occupational layer could not be stratigraphically proven. However, samples for thermoluminiscence dating have been taken (fig. 13). Furthermore six duplicate samples for studying soil micromorphology and geochemistry, as well as three OSL dating samples, were obtained.

During the clearing of the section a large bone later identified as a hippopotamus humerus (fig. 12) was found and the surrounding area cleared down to Planum 1 was enlarged to roughly 9m² (fig. 15). The surface of the layer consisted of numerous slab and cobble stones originating from ridges of weathered quartz and metamorphic rock located nearby. They had been brought to the site most likely in order to support huts or tents or to be used as anvils. After the orthophotographical documentation of the area (Colour fig. 1), it was decided to cut layer 1 and to remove all archaeological remains from an area of 2.4m². This step produced extraordinary high amounts of finds (tab. 2), most of which are lithics amounting to nearly 10,000 pieces. Among them were also 2.5kg of lumps of burnt clay that originated from former fire places and fire pits. As no pits were found in this part of the section, it seems likely that the finds had eroded down from the higher terrace where the fire pit described above – of yet unknown age – was located. Animal bones, though all of them fossilised, were quite rare and include fish, crocodile, gazelle, bovidae, hippopotamus and unidentified mammalia (tab. 3). Other organic materials such as small bones, mollusk shell, eggshell or seeds were conspicuously missing.[19]

Among the flaked material, quartz was exceptionally frequent reaching proportions of up to 85 per cent. Most of the quartz and the coarse-grained Hudi chert had just been sliced into so-called wedges and flakes without preparing any platform which seems typical for the neolithic period.[20] Due to the high calcareous content of the silty sediments, the pottery fragments were often corroded giving pot surfaces a rough and gritty appearance. Thus, only few of them still bear traces of a brown burnish. Pottery decorations consist almost exclusively of rocker stamp patterns including very fine and thin dots, spaced zigzags as well as a plain zigzag variety. They are combined with impressed rim decorations or rims modelled in a wavy style.

The significance of this stratified site lies in the fact that the find layer was sandwiched between two different stages of Nile sediment aggradation. The lower stage was preliminarily attributed to a Pleistocene Nile terrace overlain by early Holocene

19 This has to be attributed either to mechanical destruction and subsequent washing-off or to leaching processes inside the calcareous sediments.

20 Kobusiewicz 2011.

lake sediments. The latter must have been sharply undercut and thus removed by a Nile meander or tributary before the artefact-rich layer could have sloped down from the top of the earlier lake sediments during a landslide.[21] Finally the artefact layer being now at the bottom of the new alluvial basin got sealed by up to two metres of mid- to late Holocene alluvium which prevented mixing with more recent finds.[22] Through excavation of this site a statistically relevant single-phase mid-Holocene find collection (tab. 2) has been obtained, which will be most useful for the study of the local chronology.

MOG114 (Mikaisir West)

MOG114 was chosen to be test-excavated to compare sites and their preservation from the northern Nile bank with those studied on the southern bank (MOG106, MOG116). With MOG114 we face a situation common at northern Mograt that despite a rich multiperiod surface find assemblage dating from the Middle Palaeolithic, through the early Holocene to the Kerma periods, no archaeological layers, i.e. layers whose genesis is more or less contemporary to or postdates the period of artefact deposition, are preserved. In trenches 1 and 2 the basement was reached at a depth of 10cm, while in trench 3 the surface of an older sterile silt terrace appeared at a depth of 10 to 20cm.

Geomorphological research provided insights into the complex modifications of this landscape. Hard volcanic and metamorphic rocks appear as highly weathered ridges running parallel to the river. Wind abrasion is the most important erosional factor in this place. One of the reasons why the ridges stand out is that the bedrock of the shallow and narrow valleys inbetween was composed of more easily weatherable limestone. The presence of wind-grooved rocks across the entire landscape indicates this to be a yardang which is a typical feature of desert landscapes.[23]

Fig. 16: MOG086, test trench 1. Overview of the excavated area showing light silts changing to dark red pebbly sediments, stones and artefacts at the background have weathered out of the sediments (photo: A. Dittrich)

The sloping river bank is cut by several northward draining dry valleys (wadis). They show evidence for pans and crusts indicating the presence of shallow water during the rainy seasons.

At the valley floors the wadis often contain remnants of Holocene alluvial deposits (cf. fig. 26) as it was also observed for the southern Nile bank (cf. MOG107, MOG116). Recent water activity seems to be responsible for the relocation of most of the artefacts along with softer sediments down the northward slope. However, larger particles and artefacts have sometimes been piled up at the leeward side of the ridges that formed natural barriers to the movement.

2.2 Test excavations at inland sites

MOG086

At MOG086, trench 1 has been set up as a test trench close to an erosional channel (*khor*) which contained lots of weathered-out artefacts.[24] Below a surface accumulation of wind-blown silts[25] two brownish to reddish iron-rich soil horizons mainly composed of small pebbles were recognised during excavation

21 A similar situation was reported by Arkell (1947: 173) for the site of Khartoum Hospital. Arkell assumed that the majority of finds that were found in a sloping position had eroded down together with the soft sediments from a former elevated settlement area (cf. Arkell 1949). Through statistical analysis of the artefact distribution throughout the colluvium at least two phases of occupation can be marked for Khartoum Hospital (Dittrich 2015: 34–39), while at Gharghara only one distinct phase is present.

22 As none of the surrounding silty sediments contained any natural components of the grain size of artefacts, also mixing with artefacts of earlier periods is to be excluded, unless people collected and brought them to the spot.

23 Edgell 2006: 15; Besler 1992: 85–87.

24 Cf. Dittrich and Geßner 2014: figs. 20.14–16; 21.9, 10, 20.

25 For this phenomenon cf. Laity 2008: 164.

Fig. 17: MOG105. Overview of the site during test excavation (photo: A. Dittrich)

(fig. 16). Besides a single slab stone in square B, no further structures were observed. The excavated finds provide a range of different artefact classes (tab. 2) as well as few small-sized bone fragments. These were remarkably better preserved than the supposedly contemporary finds from the carbonate-rich layers at the Nile terraces (MOG116, MOG106). They include remains of fish, dorcas gazelle and further yet unidentified bovidae and mammals (tab. 3).

MOG102

At MOG102 the test trench revealed a situation almost similar to MOG086. However, the excavated finds consisted not only of mid-Holocene artefacts as found on the surface,[26] but also of a plain brown-burnished pottery supposedly dated to the Late Neolithic/early Kerma period. The latter suggest that conditions favouring human occupation at this spot must have prevailed until that period. MOG102 provided the highest artefact density in that area (tab. 2). The organic remains included mollusk shells, bone fragments identified as deriving from crocodile, probably Nile monitor, gazelle and other undetermined bovidae and mammals (tab. 3), furthermore two ostrich eggshell beads and a work piece with traces of a borehole.[27] The surprising presence of gastropod species such as *Lanistes* sp. and *Pila* sp. indicate a seasonal lake or swamp nearby,[28] with varying living conditions as very small to very large specimens occurred. Nile oysters (*Etheria elliptica*) must have been brought from the Nile to the site by humans. The high degree of fragmentation thoroughly observed among both artefacts and ecofacts points to mechanical breaking caused by trampling, most probably by hoofed animals.

In the course of the excavation it became evident that the site contours defined by the distribution of lithics, potsherds and grinding equipment are much larger than previously assumed, amounting to an area of 16,295m² (cf. fig. 1) instead of 2,803m². At the centre the site encompasses a surface depression that could have been fed by run-off water during the Holocene and was habitable only at its roughly circular margins. Such a pattern of an occupied waterpond has been studied in greater detail at site MOG105, introduced in the next paragraph.

MOG105

At MOG105 the test trench was set up close to a shallow, but clearly visible surface depression (fig. 17). After finishing the ABCD test trench scheme (fig. 18), the western section was extended to 5m in length and c. 1m in depth. The stratigraphy in parts showed similarities to MOG102 and MOG086 in the presence of reddish, pebbly sediments, but additionally it exposed laminated grey silts and loose whitish

26 Cf. Dittrich and Geßner 2014: fig. 20.12, 13.

27 A radiocarbon dating of this piece is still pending.

28 Tothill 1946; van Damme 1984.

sediments the origins of which could be determined only through micromorphological analysis. These sediments produced a significant quantity of artefacts and ecofacts including small fragments of a human skull (tabs. 2, 3). The shape of the base of these sediments points to some artificial digging in that spot that may be related to the active maintenance of the depression for rain-water harvesting during prehistory.

As identified from the thin sections (tab. 1: samples 1–3), the silt-sized greyish-white deposits are products of the dissolution and reprecipitation of calcium carbonate deriving from the local bedrock (fig. 19). These processes suggest the presence of water. A fluctuating water table is furthermore indicated by the presence of iron mottles.[29] The large size and developed state of the latter indicate a prolonged period of alternating wet and dry conditions.

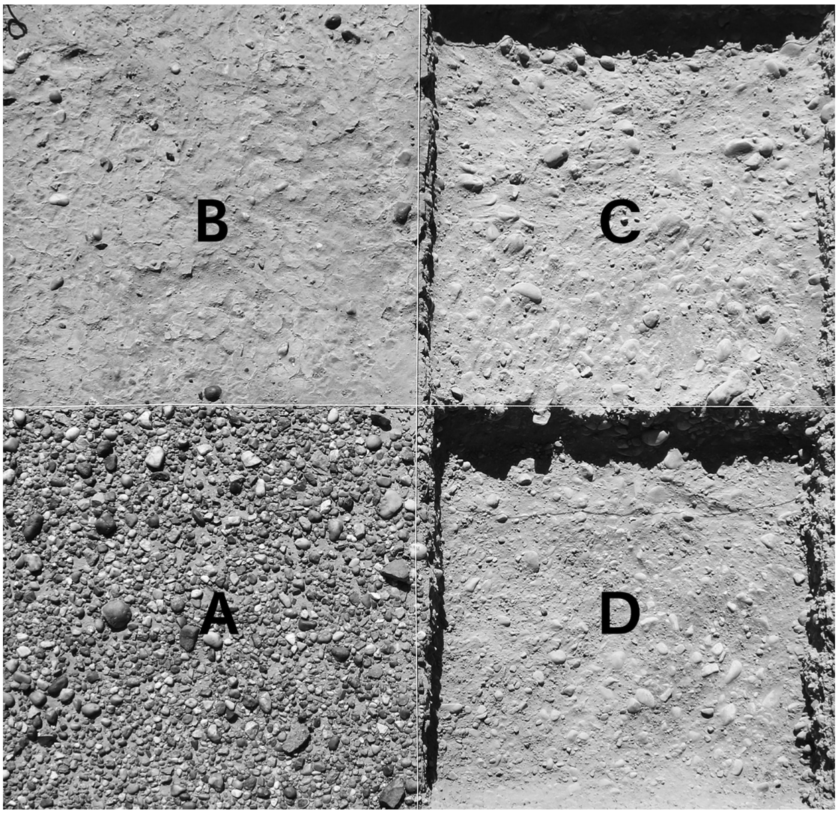


Fig. 18: MOG105, test trench 1. The ABCD scheme clearly shows the sequence of a serir cover at the surface (A), grey wind-blown silts (B) changing to sediments of local origin (C, D) (photo: M. Ehlert)

The input of vegetation is attested by organic material seen throughout the thin sections (fig. 19). There is evidence for the intense biological activity of earthworms and similar soil fauna.[30] Their activity is mainly visible in the form of soil mixed with excreta and by the breakdown of the organic matter.

From this emerges a picture of a rain-fed shallow waterpond that was surrounded by dense vegetation cover sustaining a humic top soil characterised by earthworm activity. Such soils would surely have supported the growth of savannah grasses, but also of any cultivated plant, although no evidence for them exists so far. This scenario might also apply to nearby sites MOG102 and MOG086. All of these sites provided sound evidence for grinding activities as well as indirect evidence, namely traces of trampling, for the watering of animals.

The fauna identified from the archaeological remains further suggests the presence of water or moist conditions. The date for a landsnail shell (*Zootecus* sp.) points to the presence of humic soils and grasses around 7000 calBC (tab. 4). Whether the waterpond could have sustained a permanent habitat for *Bellamya unicolor* of which one specimen was dated to about 6050 calBC is not yet clear (tab. 4).

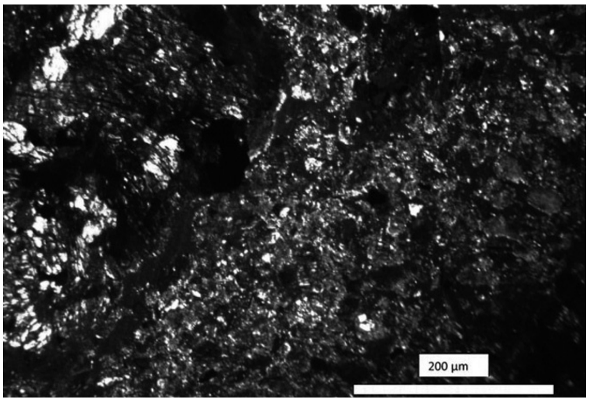


Fig. 19: MOG105. Calcium carbonates (white) observed in the groundmass together with noticeable humified organic remains (dark/black spots) moved down through bioturbation (photo: S. Neogi)

Similar to site MOG102, the shells of gastropods such as *Lanistes* sp. and *Pila* sp. found at MOG105 are generally indicative to the existence of swamps nearby. Also two vertebrae of catfish (*Synodontis* sp.?) and a reptile bone (*Varanus niloticus*?) were recovered from the test trench (tab. 3). Addition-

29 Courty et al. 1989.

30 Kooistra and Pulleman 2010.

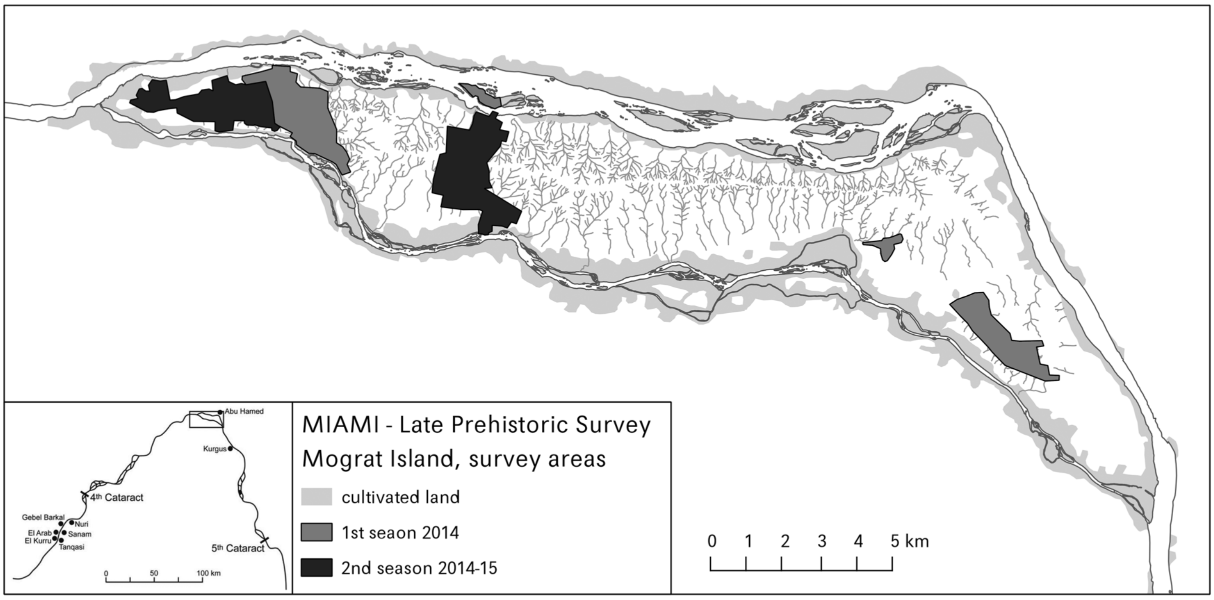


Fig. 20: Mograt Island. Surveyed areas of the Late Prehistoric Survey during seasons 2014 and 2014/15 (map: A. Dittrich)

ally, two complete and one broken ostrich eggshell bead were found. The latter has been dated to c. 5620–5550 calBC indicating a mid-Holocene occupational event that is further substantiated by two dates for freshwater snails spanning a period of c. 5530 to 5380 calBC (tab. 4). These snails were present at the site as immature to very large specimens which could be interpreted as a sequence of abrupt drying conditions (c. 5530–5480 calBC) followed by a period of recurrent moist conditions (c. 5470–5380 calBC). Presently, it is not clear whether these snails were brought to the site through human activity, or

topography	structure of sites	artefact density	secondary artefact density	research strategy	height of area	sites of MIAMI 2014/15
1) basement granite outcrops fields (including palaeo-cataracts)	handmills at rock surfaces, light to dense scatters	low to absent on rock surfaces	horizontal re-deposition, artefacts washed down from the rock surfaces, high density in alluvial fills between rocks	mapping	313–321 m	MOG118 MOG121 MOG122 MOG123 MOG124 MOG126 MOG127
2) pebble plains/serir a) at bars protruding to the Nile banks	light to dense scatters, hard to recognise due to pebble texture	medium	horizontal re-deposition through small khors (washing)	mapping, surface collection	316–322 m	–
b) at the watershed				test excavation, soil sampling	325–330 m	MOG128 MOG129 MOG132 MOG133
c) above alluvial sediments	not visible at the surface	low to absent	freshly broken artefacts randomly brought up through recent digging activities (pit fields)	mapping	321–323 m	MOG120 MOG130 MOG131
3) hammada a) above basement	light to dense scatters, easy to recognise as most materials are alien to the pre-cambrian basement complex	medium, often heavily eroded	vertical re-deposition due to desiccation cracks and other dynamics of hammada surfaces	mapping, surface collection (test excavation)	319–325 m	–
b) above silt sediments in alluvial plains (Nile terraces)	light to dense scatters, easy to recognise as most materials are alien to alluvial environments (except mollusks)	medium to dense, often calcified	vertical and horizontal re-deposition due to deflation, washing and soil erosion	mapping, surface collection, excavation, stratigraphical recording, soil sampling	308–313	MOG119 MOG125
4) silt mounds	stratification, ecofacts (mollusks) present	–	vertical re-deposition	logging, stratigraphical recording, soil sampling, extracting of mollusks	305–312	–

Tab. 5: Mograt Island. Sites recorded during the Late Prehistoric Survey 2014/15 according to specific environments as previously observed for the area

whether the waterpond itself was a suitable habitat for them. Among the mammalian bones so far only dorcas gazelle has been identified to species level (tab. 3).

3. Survey

The actual survey (fig. 20)[31] extending to the western tip of the island (Ras al-Jazira) produced only two late prehistoric sites located close to the southern Nile bank (fig. 1: MOG118, MOG119). While the northern bank is more densily populated today and therefore subjected to various manipulations on the ground surface (e.g. football pitches, clearings, transmitter towers), the western part of the island also slopes significantly to the west, draining into the alluvial plain that would cover or disturb potential early Holocene deposits. No further sites related to the watershed scheme (tab. 5: 2b) were found, however, four sites of this type were located at the second survey area comprising a transect stretching from Kurta Island to the southern bank (fig. 1; tab. 5: MOG128, MOG129, MOG132, MOG133). Here the central watershed area is much wider, expanding over 1km from north to south, and could have supported local water storage at plains and depressions

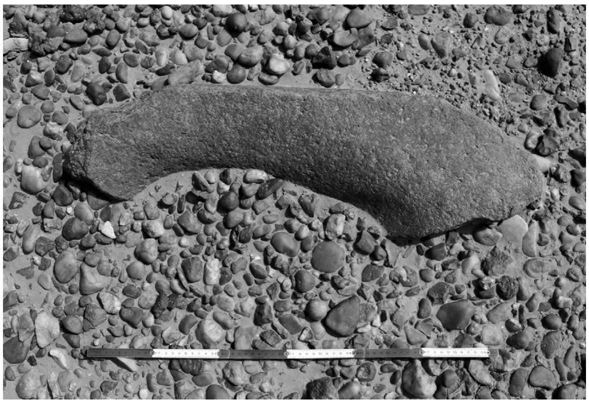


Fig. 21: MOG133. Half of a grinding base partly covered by serir (photo: A. Dittrich)

at a larger scale. As a typical feature of the sites in such locations, large grinding base fragments were found at MOG128 and MOG133 (fig. 21) some of which had recently been reused as road markers (*alamat*).

As the central survey area also covered the large granite plateau south of Kurta Island, handmills on rock surfaces associated with light artefact scatters (tab. 5: 1, six sites) occured more frequently than in other parts of Mograt Island.[32] At MOG124 – close to the river – a dense artefact deposit rested directly on the granite rock surface (fig. 22) indicating the

Fig. 22: MOG124. A fill consisting of gravel, pebbles and numerous artefacts rests directly on the bedrock (photo: A. Dittrich)

31 The survey was conducted by A. Dittrich and K. Geßner.

32 Cf. Dittrich and Geßner 2014: 131, fig. 6, tab. 1.

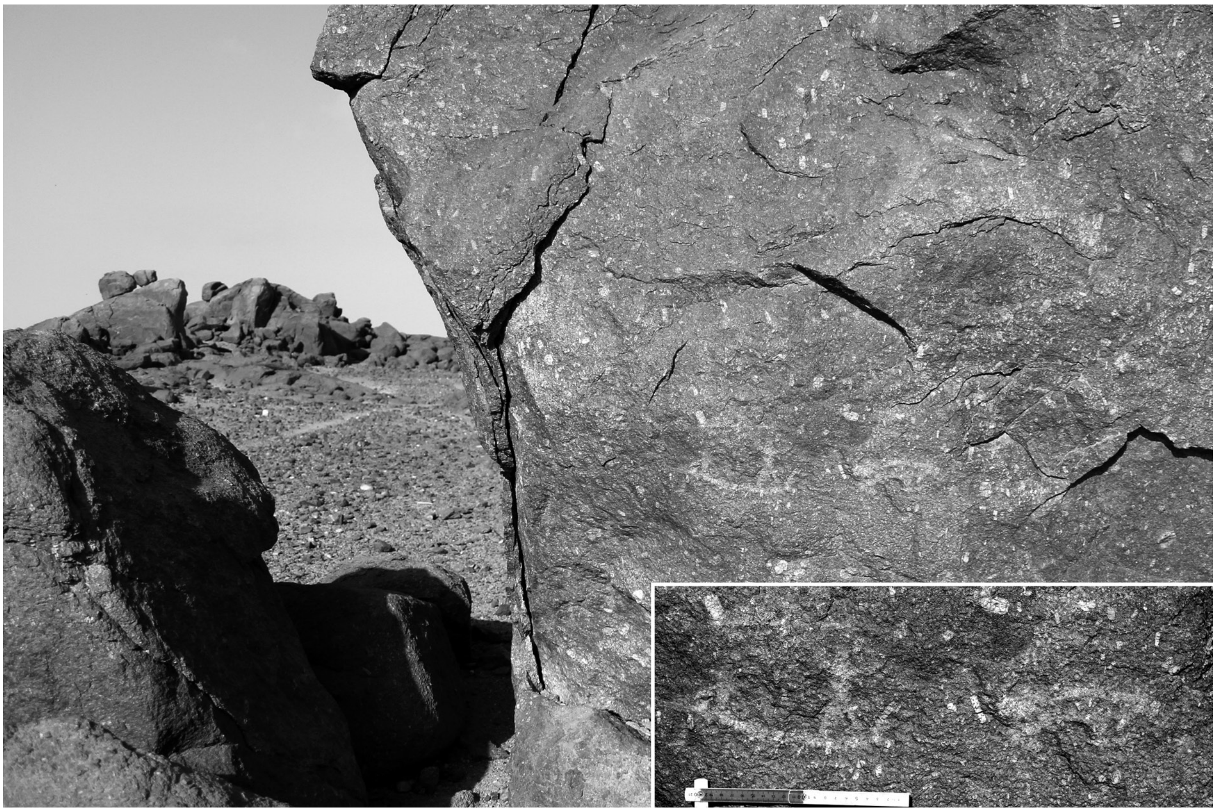


Fig. 23: Waypoint 170. Pecked rock art scene of a hippopotamus hunt (photo: A. Dittrich)

complete loss of sediments since the early Holocene, amounting up to several metres.[33] The lithics found at the scatter indicate a blade or blade-like flake industry which would point to an earlier date within the Holocene sequence.

Linked to a peculiar porphyritic granite,[34] one of the few rock art sites beside the well-known site of al-Saihan[35] was found (waypoint 170, fig. 23, Colour fig. 2). The singular depiction shows a man standing in a boat spearing or harpooning a hippopotamus.[36] The upward curved ends of the boat suggest it to have been made of papyrus.

33 As discussed for MOG114, wind and water erosion seem to have been more pervasive phenomena at the northern Nile bank, resulting in the loss of fine-grained soils while artefacts may have been held back at the leeward side of bedrock ridges and yardangs. The artefact scatter of MOG124 is actually situated at a height of only 313–314m a.s.l. which is still about 10m above the present Nile level, but lower than the reconstructed maximum Nile level during the early Holocene.

34 Grinders made of this specific granite variety have been found elsewhere on Mograt Island.

35 Cf. the unpublished doctoral thesis of Fawzi Hassan Bakhiet Khalid (University of Lille, 2009).

36 The sujet of the hippopotamus hunt has been attested since prehistoric/predynastic times in Egypt. In the Pharaonic era, the king was often depicted in the hunting pose, symbolising the establishment of order over chaos (Säve-Söderbergh 1953; for predynastic representations cf. also Hendrickx 2011: figs. 1, 6–8; thanks to C. Näser for information on this article).

Most of the surface finds at the newly discovered sites had weathered out of sediments or had been brought up by recent digging activities. The latter produced most of the finds at MOG120[37] where large potsherds of mid-Holocene to late neolithic date as well as human bone fragments (tab. 3) and mollusk shells were recorded. These finds hint to the presence of (disturbed) graves.

Around one of the largest post-Meroitic tumuli at the centre of the island a further large mid-Holocene settlement was found (MOG129). It featured pottery with typical rocker stamp decorations, but also a concentration of Dotted Wavy-Line type pottery (fig. 25), which is commonly dated to the late mesolithic period, in one spot.[38] These two sites overlook an older river bank that is located up to 1.5km inland of the present alluvial plain (fig. 24) due to the meandering character of this Nile section. No prehistoric sites have been found south of the 320m contour line (fig. 1). This area was dotted with pits from the recent extraction of calcareous sediments (fig. 24) which contain calcified rhizoms and large shells of *Lanistes* sp. The presence of both indicate a much wider flood plain and alternating wetting and dry-

37 Although some of the extraction or robber pits look quite fresh, in the case of MOG120 they could clearly be identified at a Corona satellite image of as early as 1965.

38 Dittrich 2011, 2015.

Fig. 24: Mograt Island. View from site MOG120 towards the southern Nile branch; the presence of recent alluvium is indicated by vegetation while calcareous sediments exposed through pit digging (spotted area) mark the the maximal extension of early Holocene swamps (photo: A. Dittrich)

ing events[39] during the early to mid-Holocene.

From the preliminary results of the survey it can be concluded that sites at the southern and middle part of the central transect tend to be larger and better preserved (fig. 1). They follow a pattern already observed at western Mograt where during the mid-Holocene two main locations became attractive because of (1) the presence of rain-fed waterponds and humic soils (watershed scheme/pebble plains) and (2) the emerging alluvial plains deposited through the southern Nile meander[40] within the corridor limited by the 315m contour line (Nile terrace scheme).

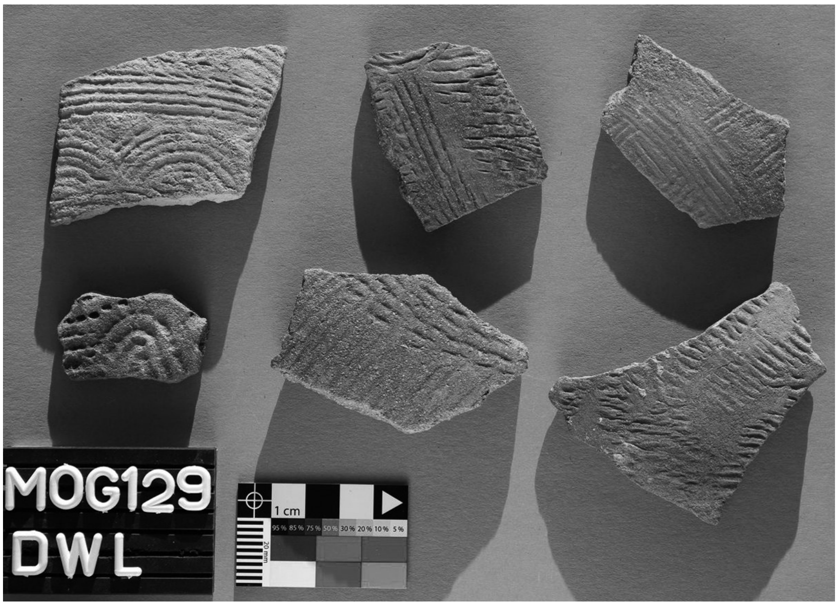


Fig. 25: MOG129. Surface finds of pottery decorated with dotted wavy-line (left) and other varieties of comb impressions (photo: A. Dittrich)

In the geoarchaeological survey, further locations of Holocene silts preserved at valley floors were identified near the northern Nile branch (fig. 26). Future investigations will allow us to compare them to the patterns postulated for the southern part of the island.

With the location of 16 new sites on Mograt Island, the total number of late prehistoric sites so far recorded by GIS amounts to 43 and – if all known sites with a late prehistoric component are considered – 70. Thus, the suggested landscape and occupation patterns can be verified at a larger scale.

39 Cf. similar observations at Boni Island (Ritter 2012: 81–82).
40 This shifting river course appears to be different from the northern Nile branch which was probably always more confined to its present deep tectonic riverbed.

Fig. 26: Early Holocene silts preserved at the valley floor later cut and washed by a wadi, note the cover with more recent hammada (near al-Kinawiya; photo: A. Dittrich)

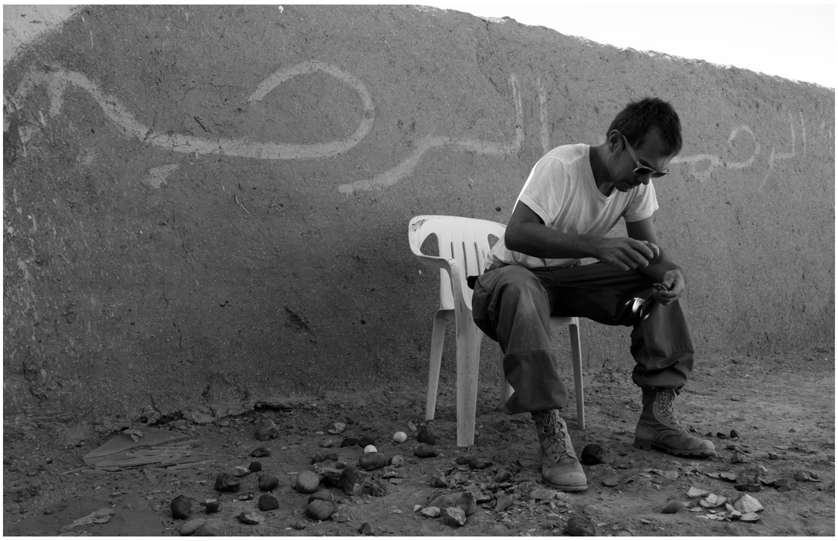


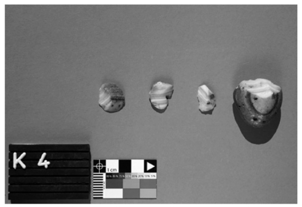
Fig. 27: Conducting the knapping experiment at the dighouse (photo: A. Dittrich)

4. Knapping experiment

The knapping experiment aimed at testing the suitability of different local raw materials for knapping in order to describe different strategies (fig. 27; tab. 6).[41] The pebbles required as raw materials were provided either through collection during the regular survey or from the vicinity of investigated sites (MOG107, MOG105). Although pebbles are available almost everywhere at the island, different qualities exist with the freshest ones usually deriving directly from wadi beds and the most patinated and brittle ones found at the oldest exposed surfaces at the centre of the island. In the vicinity of wadis, often tested ancient pebbles can be found as the prevailing whitish to greyish cortexes of cherts and agate do not provide any indication as to the inner properties including colour and hardness. Many pebbles can be attributed to varieties of chert while in some formations opaque quartz pebbles prevail.[42] Tabular quartz and even metamorphic rock obtained from the basement ridges have also been widely used. A green chert variety, translucent

41 The experiment was carried out and documented by M. Ehlert.

42 This suggests that both formations are of different origin and age as argued also for Lower Nubia (Butzer and Hansen 1968: 112).

Investigated categories	Chert (brown, red, grey, black, beige)	Chert (green)	Hudi Chert/Jasper (ochre)	Agate (reddish/white, opaque to translucent)	Quarz (white, opaque)
properties	takes direct hard hammer percussion very well, bladelets can be easily obtained through glancing/raking blows to the platform edge, best results with a soft hammerstone, bladelets obtained this way have small bulbs and thin butts but do not shatter and provide sharp, stable edges	similar to brown or red chert, but the fracture is dyer so knapping requires slightly more energy	the more reddish or brighter nodules are of lower quality, dry and hard, almost impossible to knap, the flakes shatter; brown nodules can be successfully knapped with a large, hard hammerstone, large flakes can be obtained by downward blows further away from the platform edge; only big and thick flakes do not shatter at detachment	homogenous pebbles knap easily and take hard hammer percussion relatively well; pebbles might split irregularely due to macrocristalline or drusy structure	knapping takes more energy that the remaining raw materials, but is relatively easy; the flakes shatter, even the big and thick ones; larger pebbles can be easily sliced into large flakes with downward blows to one of the flat faces, without any preparation or maintenance
heat pre-treatment	matrix becomes more reddish and sligthly glassy, knapping is easier, but flakes and blakes are much more brittle and shatter readily	tested pebbles were not affected by heat in any way	the nodules turn noticeably red and are slightly more knappable, but shattering of flakes increases	heat deepens the colour and seems to make knapping easier	tested pebbles were not affected by heat in any way
application	microlithic tools from blades and bladelets, even thin flakes do not break easily when retouched or backed on an anvil unless there is a flaw or an error	larger blades; microliths are more difficult to make due to the hardness	unsuitable for microliths and thinner blades; flake edges are quite dull, unstable and uneven due to numerous inclusions and hollows; they are usable only after the edges are strengthened by retouch (scrapers etc.); large nodules can be used for flake or Levallois cores	small size of pebbles limits the range of applications to microlithic and small Levallois cores; pebbles serve very well as soft hammerstones for chert	small pebbles – bipolar cores; large pebbles – sliced flake cores; flat pebbles can be easily transformed into bifaces or Levallois cores
products of experimental knapping					

Tab. 6: Knapping properties and suggested applications for various raw materials occurring on Mograt Island (photos: A. Dittrich)

to opaque agate, occuring always as pebbles with whitish crusts, as well as an ochre-coloured jasper are among the most noticable materials. The jasper contains many impurities such as cracks and hollows or spotted patterns from inclusions other than the opaque cryptocristalline quartz. The same can be said of the Hudi chert, but here the inclusions can be attributed to visible small shells. Therefore, it is also known as fossiliferous chert supposed to be of Tertiary age.[43] Besides that, oolitic cherts are present at Mograt. The impurities of these materials clearly set a limit to stone knapping, excluding them for instance for the fabrication of microliths, but nevertheless they were frequently used for flake production all over the island.

From the experiments it can be concluded that the tested materials responded differently to heat pretreatment which would also be recognisable with prehistoric artefacts, especially those made from chert (except the green variety) and agate. Clearly, specific raw materials were preferred for the manufacture of specific tool classes (tab. 6). As there is no direct relation between the stone varieties present at the sites and the kind of pebbles available in the vicinity of these sites, it can be assumed that raw materials were always selected from various spots on the island according to their suitability for actual needs.[44] Thus, changing preferences in raw materials, as evidenced e.g. in the proportions of chert and quartz which differ significantly between individual sites, might be due to the presence of subsequent chronological phases rather than to their local availability.

5. Conclusions and outlook

The research objectives related to the change in Holocene landscapes on Mograt Island, which certainly also fostered changing human adaptations to insular environments, were followed up by a combined approach. Stratigraphical observations provided insights into the late Pleistocene to mid-Holocene sedimentary record to which artefact layers can be attached with varying chronological precision. The dating of sediments still has to be complemented by OSL dating. Field observations were backed by soil and micromorphological studies which overwhelmingly hint to the former presence of moister conditions supporting vegetation and humic soils, but also to the frequent alternation between wetting and drying events which indicate a pronounced seasonality during the Holocene. The environmental record is expanded by the identification of faunal species the remains of which were found during excavation. All of the test-excavated trenches provided statistically relevant numbers of finds which will be the subject of more detailed study.

The different states of site preservation observed for various parts of the island can be explained by differing erosional patterns in connection with prevailing wind directions, channeling through surface water and the exposure of the Precambrian basement or cemented Pleistocene terraces from which sediments and finds were often washed down. Therefore, we still face the problem that prominent sites do exist in certain places where – often secondary, yet somehow stabilised – artefact accumulations and favourable topographic conditions protecting them from wind and water activity converge which, however, does not necessarily reflect the full range of sites and their spatial relationships in the past. This might also explain the low number of burial or ritual sites discovered so far during the survey. Recent results indicate a greater density of sites in central Mograt where accordingly the survey will be continued in the coming season.

The preliminary results suggest a pattern of changing habitational preferences moving in the long term from a shoreline occupation based on aquatic resources in and around closed-off lagoonal lakes to a Nile terrace occupation benefitting from the arable alluvial soils[45] as a leftover of the early Holocene lakes and swamps. It would seem tempting to connect this change to the much debated Mesolithic-Neolithic dichotomy, but Mograt Island seem to hold sufficient archaeological and geoarchaeological potential to pursue the study of the actual transition with the detail it deserves.

43 Whiteman 1971; Medani 1972; Prasad et al. 1986. At MOG105 a large flat pebble of Hudi chert was excavated from an *in-situ* pebble bed which would suggest the former existence of a local fossiliferous chert formation.

44 Pebble formations that are exposed at the surface today might have been covered by soils during the past. This was certainly the case at MOG106 where the *in-situ* pebble layer had remained untouched in the past because then it was hidden under calcified sediments frequently causing the natural splitting of pebbles due to salt weathering.

45 The mixture of Holocene mineral-rich alluvium, loamy sediments and sandy colluvium along with a humic top soil would have provided arable soils (Jones et al. 2013).

Acknowledgement

The authors would like to thank the project management and first of all Claudia Näser for a pleasant and constructive cooperation, the logistic team for setting up – as usual – a convenient working atmosphere, and the people of Mograt for their hospitality. Special thanks to Hassan Mustafa Alkhidir Ahmed for his tireless organisational efforts and help in supervising excavation work as well as to all colleagues of the National Cooperation for Antiquities and Museums for their cooperation in the export of samples. We also thank Gemma Tully for proofreading the English.

Postscript

After the submission of the manuscript, three additional radiocarbon dates were reported by the Poznań Radiocarbon Laboratory. Deriving from the test trench 1 at site MOG102, the shell of a Nile oyster (*Etheria elliptica*) gave a date of 5525–5468 calBC (1st sigma, Poz-75231) and an ostrich eggshell bead workpiece was dated to 5530–5473 calBC (1st sigma, Poz-75368). They corroborate the dating of a mid-Holocene occupational event as outlined for site MOG105. A large specimen of *Lanistes* sp. collected from the early Holocene alluvial plain south of MOG120 (fig. 24) was dated to 6477–6413 calBC (1st sigma, Poz-75369).

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Zusammenfassung

Der Late Prehistoric Survey als Teilprojekt der Mograt Island Archaeological Mission setzte seine Arbeit in der Winterkampagne 2014/15 fort. Dazu gehörten Ausgrabungsarbeiten auf zuvor lokalisierten Fundplätzen, die einerseits der Dokumentation von früh- bis mittelholozänen Stratigrafien (MOG106/107, MOG116) und andererseits der Testuntersuchung hinsichtlich der zu erwartenden Präsenz von Fundschichten und -materialien (MOG082, MOG102, MOG105, MOG106) dienten. Diese Arbeiten wurden von geoarchäologischen Untersuchungen der freigelegten Sedimente begleitet, die ferner Probenentnahmen zur Herstellung von Dünnschliffen für mikromorphologische Studien, geochemische Analysen sowie zur OSL-Datierung beinhalteten. Die Auswertung der Dünnschliffe liegt für MOG105 und MOG107 vor. Sowohl klimatische als auch besiedlungsgeschichtliche Ereignisse sind für MOG105 durch eine Radiokarbondatenserie zeitlich fixiert.

Parallel dazu wurde der archäologische Survey an der Westspitze der Insel sowie in einem zentralen Prospektionsstreifen südlich der Insel Kurta fortgesetzt. 16 neu entdeckte Fundplätze lassen sich den zuvor beobachteten naturräumlichen Gegebenheiten zuordnen und weisen ein vergleichbares Fundbild auf. Da der Survey das exponierte Granitfeld im Norden Mograts einschloss, ist die Zahl der Fundplätze mit in den Felsen eingelassenen Reibschalen besonders hoch, während die Erhaltung der holozänen Decksedimente aufgrund von Auswaschungen entsprechend gering ausfällt (z.B. MOG124). Ferner wurde in diesem Bereich ein isoliertes Felsbild, das eine Nilpferdjagd zeigt, lokalisiert. Auf dem zentralen Plateau der Insel sowie im südlichen Abschnitt folgen die Fundplätze hingegen dem Schema der Lokalisierung an (1) natürlichen Geländesenken, welche bei ausreichenden Niederschlägen durch Regenwasser gespeist worden sein können, und (2) auf alten Nilterrassen, welche die mittel- und spätholozänen Schwemmebenen überschauen, deren Alluvium noch heute die Grundlage für eine ausgedehnte landwirtschaftliche Nutzung bildet. Hier ließe sich der mittelholozäne Landschaftswandel, der langfristig in einer Neuorientierung hin zu Weideflächen und der Bewirtschaftung frühholozäner alluvialer Böden mündet, über Detailstudien besonders gut nachvollziehen.

Daneben wurden verschiedene Rohmaterialien für die experimentelle Herstellung von Steingeräten getestet, um deren Eigenschaften hinsichtlich der geläufigen Abbaustrategien und der Vorbehandlung durch Erhitzen zu untersuchen. Als vorläufiges Ergebnis ist festzuhalten, dass die in der Prähistorie verwendeten Nilkiesel sowohl von verschiedenen Vorkommen auf der Insel als auch im Hinblick auf verschiedene Endprodukte wie Mikrolithen oder makrolithische Abschläge selektiert worden sind. Dies stützt die Annahme, dass die unterschiedlichen Präferenzen, die sich in stark variierenden Anteilen von Chert und Quarz innerhalb der einzelnen Fundinventare manifestieren, nicht an kleinräumliche Vorkommen, sondern an zeitlich divergierende Strategien gebunden sind.