

Mathias Lange

The archaeology of Wadi Hariq (NW-Sudan): Results from the excavations 1999 and 2001.

Abstract:

During two seasons of excavation and intensive surface survey carried out in Wadi Hariq (NW-Sudan) in 1999 and 2001 more than 100 archaeological sites have been found. Two of these will be presented here. Pottery from these sites allows a classification to two different phases of the Handessi Horizon (ca. 2200 to 1500 BC). Bone finds indicate a subsistence as herders. Comparison of pottery decoration styles shows connections to the Nubian C-Group and Kerma culture. Combining this information with the geographical situation and chronological correlation of the sites it is possible to relate the Wadi Hariq dwellers to the Temehu mentioned by Harchuf in his famous report on his third expedition to Yam.

Introduction

In the year 1997 an expedition of the ACACIA project of the University of Cologne, led by R. Kuper and S. Kröpelin, surveyed an extensive wadi system situated in the Northwest of the Republic of Sudan. It lies ca. 300 km west of the Nile Valley and 180 km North of Lower Wadi Howar (Fig. 1). One typical feature of this Wadi system is the remains of intensively burnt, and therefore fritted sediments. These features must be the result of heavy fires on trees and gave the name for the Wadi Hariq, as Hariq is the Arabic word for fire (Jesse et al. 2004: 124). Archaeological sites discovered during this expedition showed large artefact scatters including pottery, bones, grinding implements and lithic artefacts. Thus, two seasons of extensive survey and excavation were carried out in the years 1999 and 2001 to collect a representative database for the study of the archaeology of this region. Most of the sites discovered can be related to the end of the Holocene settlement phase in this part of the Sahara, while the earlier

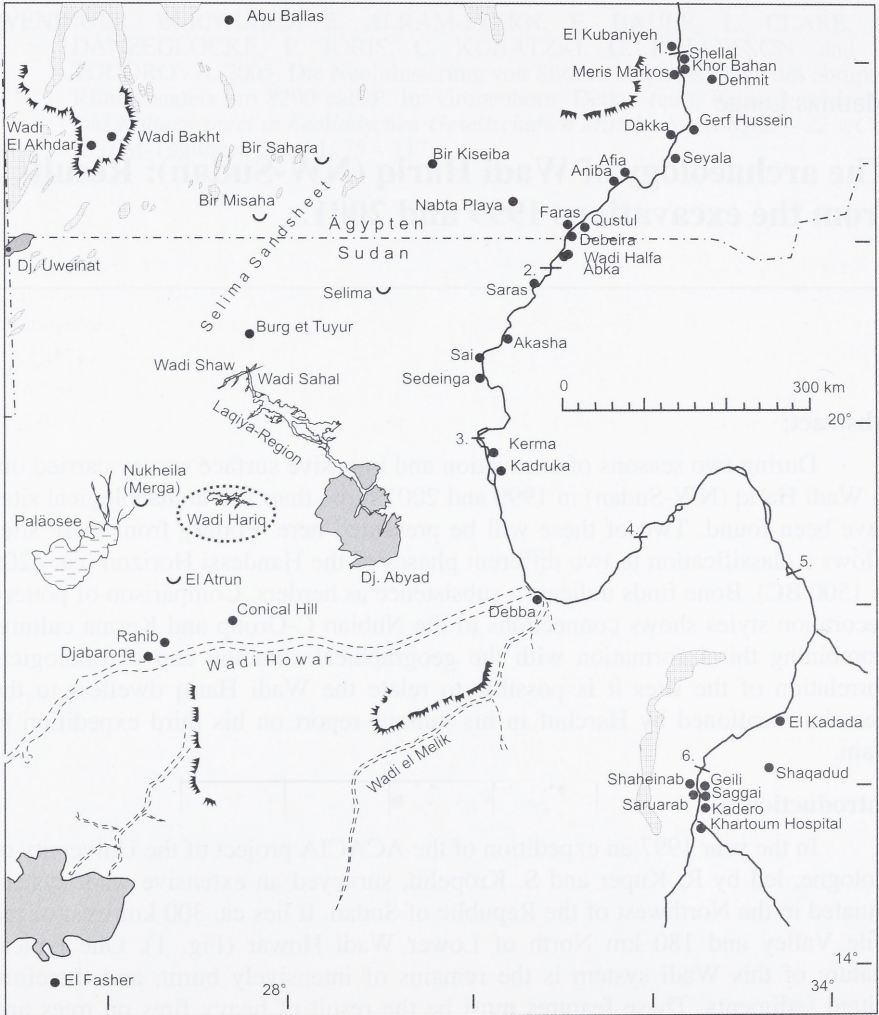


Fig. 1. Map of Northern Sudan with the location of Wadi Hariq.

Holocene and also the Palaeolithic age is represented only by very scarce finds. An overview of the archaeological sequence of Wadi Hariq has been presented elsewhere (Jesse et al. 2004). This paper will concentrate on two settlement sites

of the latest settlement phase, the Handessi Horizon (cf. Jesse this Volume, Keding 1998, Lange in press). The first one, Wadi Hariq 97/7 lies in the eastern part of the wadi system, while the second one, Wadi Hariq 01/1 is lying more to the west. Both sites are situated on the floors of large separated basins containing playa sediments as well as sandy layers.

Wadi Hariq 97/7

This site lies at the south-eastern end of a wadi channel stretching from northwest to southeast and connecting the two main Wadi channels. In an area of ca. 500 by 500 m the whole floor of the wadi is scattered with artefacts in various density. The great majority of the finds is lying in a layer of aeolian sands or on the playa. Only a few finds are still embedded in the playa sediments. A detailed surface survey was carried out with a total station in order to get information about the spatial distribution of the different types of artefacts. In the eastern part of the site, a number of stone settings and knapping sites were more or less well preserved. On the western edge of the wadi, in front of a sandstone cliff, several

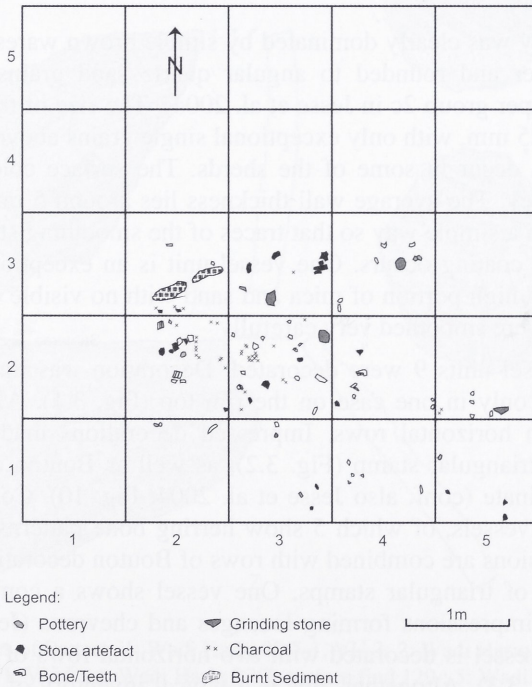


Fig. 2. Wadi Hariq 97/7-1. Excavation area after removal of aeolian sand.

concentrations of pottery, bones, grinding implements and stone artefacts were found. Here an area of 5m x 5m was excavated.

The excavation Wadi Hariq 97/7-1

After cleaning the surface a clear concentration of artefacts still embedded in the playa sediments became visible (Fig. 2). It included pottery, bones, lithic artefacts and grinding implements as well as charcoal concentrations and a few spots of baked sediment. Obviously, this concentration was lying in the area of a fireplace, around which activities of daily life once were centred. Charcoal remains from this concentration were determined botanically as *Acacia spec.* Two 14C-datings gave results of 2055±65 calBC (KN-5327: 3675±40 BP) and 2213±67 calBC (KN-5447: 3785±40 BP).

Pottery

The number of pottery fragments from this excavation sums up to 345 pieces with a weight of 862 g. Most of these are abraded on either one side or both, and therefore only 150 sherds, which were regrouped to 18 vessel units, could be examined.

The pottery was clearly dominated by simple brown wares with a mixture of organic temper and rounded to angular quartz sand grains as non-plastic components (temper group 2c in Jesse et al. 2004). The size of the sand grains is mainly below 0,25 mm, with only exceptional single grains above 0,5 mm. Small amounts of mica occur in some of the sherds. The surface colour varies from brown to dark grey. The average wall thickness lies around 5 mm. The surfaces were smoothed in a simple way so that traces of the smoothing still occur. In one single case a red coating occurs. One vessel unit is an exception though, as its temper contains a high portion of mica and sand with no visible organic remains and its surfaces were smoothed very carefully.

Of 18 vessel units 9 were decorated. Decoration was limited to the rim zone and occurs only in one case on the rim top (Fig. 3.1). Almost all motifs were arranged in horizontal rows. Impressed decorations made either with a comb or with a triangular stamp (Fig. 3.2), as well as Bouton decoration (Fig. 3.1) clearly dominate (conf. also Jesse et al. 2004: Fig. 10). Comb impressions appear on seven vessels, of which 5 show herring bone patterns. In three cases the comb impressions are combined with rows of Bouton decoration, and in three cases with rows of triangular stamps. One vessel shows a complex geometric pattern of comb impressions forming lozenges and chevrons (Jesse et al. 2004: Fig. 10.1). One vessel is decorated with two horizontal rows of irregular stamp impressions (Fig. 3.3). Altogether, this is a typical inventory of the Handessi A Horizon (Jesse et al. 2004: 156-157).

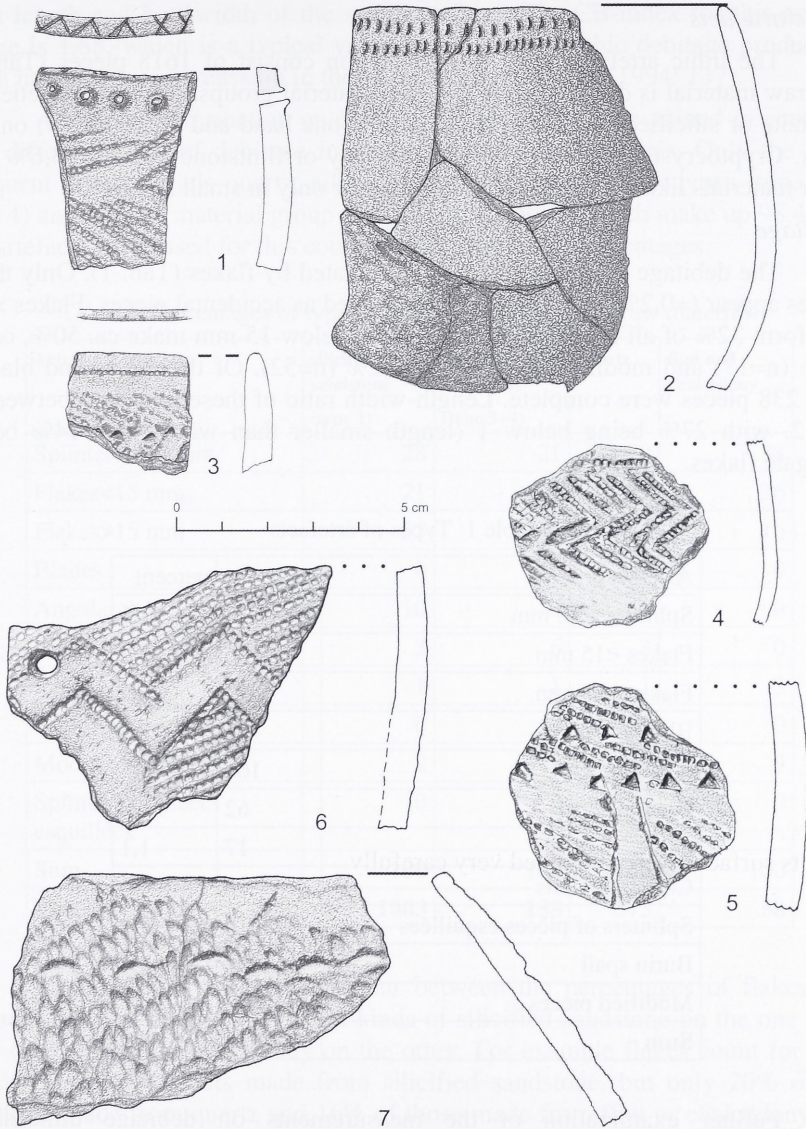


Fig. 3. Examples of Pottery. 1: Wadi Hariq 97/7-1, VU 3; 2: Wadi Hariq 97/7-1, VU 1; 3 : Wadi Hariq 97/7-1, VU 6 ; 4: Wadi Hariq 97/7, surface find 129 ; 5: Wadi Hariq 97/7, surface find 28, Wadi Hariq 01/1-1, VU 16; 7:Wadi Hariq 01/1-1, VU 21.

Lithic artefacts

The lithic artefacts from the excavation consist of 1618 pieces (Tab.1). The raw material is dominated by two raw material groups, different varieties of quartzite or silicified sandstone (72%) on the one hand and quartz (23%) on the other. Cryptocrystalline silices like chalcedony or flintstone make up 3,6% and other materials like siltstone or sandstone occur only in small amounts.

Debitage

The debitage >15 mm is clearly dominated by flakes (Tab. 1). Only three blades appear (=0,2%), which can be interpreted as accidental pieces. Flakes > 15 mm form 32% of all artefacts while splinters below 15 mm make ca. 50%, cores 1,1% (n=17) and modified pieces only 3,2% (n=52). Of the flakes and blades, only 238 pieces were complete. Length-width ratio of these is mostly between 1 and 2, with 27% being below 1 (length smaller than width) and 14% being elongate flakes.

Table 1: Types of artefacts

Artefact type	total	percent
Splinters <10 mm	447	27,6
Flakes <15 mm	340	21,0
Flakes >15 mm	511	31,6
Blades	3	0,2
Angular debris	166	10,3
Natural debris	62	3,8
Cores	17	1,1
Core fragments	6	0,4
Splinters of pièces esquillées	13	0,8
Burin spall	1	0,1
Modified pieces	52	3,2
Sum	1618	100

Further examination of the measurements on debitage dimensions included the CB-Index, as described by W. Schön for neolithic sites from Gilf Kebir (Schön 1994: 137). It gives a meaningful technological index, which can be used for comparisons with other assemblages. The CB-Index is calculated by dividing the product of the mean values of width and thickness of the complete unmodified artefacts of an assemblage through the product of the mean values of

butt length and butt width of the same artefacts. The CB-index for this assemblage is 1,88, which is a typical value for a Late Neolithic debitage production with hard hammer percussion in the Eastern Sahara (Schön 1994: 137).

Additional information on debitage production can be gained in counting the different types of debitage in relation to the raw materials. Only the most frequent raw materials quartz, silicified sandstone of different types (type 1, 3 and 4) and the raw material group flint and chalcedony, which make up 98,4% of all artefacts, were used for this count. Table 2 gives the percentages.

Table 2: Percentages of types of artefacts in relation to raw materials

Artefact type	silicified sandstone (type 1)	silicified sandstone (type 3+4)	quartz	flint and chalcedony
Splinters <10 mm	28	21	29	38
Flakes <15 mm	21	23	22	26
Flakes >15 mm	35	46	20	16
Blades	0	0	0	0
Angular debris	10	3	15	9
Natural debris	3	6	3	0
Cores	1	1	1	3
Core fragments	0	0	1	0
Modified pieces	2	1	6	9
Splinters of pièces esquillées	0	0	5	0
Sum	100	100	100	100
Total	1003	158	373	58

Some striking differences occur between the percentages of flakes and angular debris among the different kinds of silicified sandstone on the one hand and quartz and flint/chalcedony on the other. For example flakes count for 46% or 35% of the artefacts made from silicified sandstone, but only 20% of the artefacts made from quartz and 16% of those made from flint or chalcedony. On the contrary, angular debris makes up 15% of the artefacts from quartz, while 3% in the type 3 and 4 variants of silicified sandstone and 10% in type 1, and 9% in flint and chalcedony. Furthermore, flint and chalcedony have the highest percentage of splinters, while they have the lowest number of flakes. These different values can be best explained by the different traits of the different raw

materials. Quartz is locally available: It occurs in small rounded pebbles, withered out from Mesozoic conglomerates that form parts of the plateau of the Wadi Hariq. These quartz pebbles are not suitable for the production of large flakes and are mostly knapped with bipolar technique, resulting in a high number of scaled pieces (“pièces esquillées”), which were probably not used as tools but as cores, and the high frequency of angular debris. Silicified sandstone is the other type of easily available raw material. This raw material appears in many different coloured varieties. As it forms the major part of the local plateau it appears on all sites investigated in Wadi Hariq, though there are differences in the varieties on every site. On the contrary, flint and chalcedony are extremely rare and seem to have been brought to the site from further away. As the splinters from these materials have the largest share with 38%, one can guess, that some flakes or tools of flint were brought to the site and (re-)modified. This is also supported by the high percentage of tools made of flint. Three cores were also found, and these are very small, thus they have been used until the very last end, again pointing to a limited availability of these cryptocrystalline materials.

Table 3: Types of modified pieces in relation to raw material group

Tool type	Silicified sandstone, quartzite (all types)	Quartz	Flint and chalcedony
Use retouch, edge-splintering		5	1
Shallow ventral splintering		1	
Splintered piece		1	27
Continuous edge-retouch		3	1
Borer		1	
Scraper		1	
Truncation		1	
Triple-edged piece		1	
Unclass. modif. Fragments		6	
Sum		20	27
			5

Modified pieces

Tool types were defined according to Schön (1994: 134-136). Of the 52 modified pieces 31 are scaled pieces (Tab. 3). It is questionable, whether these formed a real tool class or rather represent a special kind of flaking technique, or both. Most of these are of quartz (n=27), but some also of flint or silicified sand-

stone. Some of the scaled pieces from quartz are made of pebbles and show only minor bipolar splintering on the ends. Others represent a much later stage of use and show no rest of the pebble cortex. Some also show remnants of the ventral surfaces of flakes (conf. Jesse et al. 2004: Fig. 11.1), thus are definitely re-used flakes. It is nevertheless not possible to decide for each scaled piece made of quartz, whether it was made of a flake or pebble, and therefore it was decided here to put them all into the tool class.

The other tool classes comprise mostly use-retouched pieces (n=8) and pieces with continuous edge-retouch (n=4). Furthermore there are one borer, one side/end-scraper, one truncated piece and one triple-edged piece. Like in the debitage, most tools were made of silicified sandstone or quartz.

Tool dimensions are rather small for most pieces. Although there is not a single geometric microlith, there are many tools, which are of microlithic dimension: 31 pieces are not larger than 30 mm, and 17 even not larger than 25 mm. Nevertheless, most of these are scaled pieces and mostly made of quartz (n=24). The small dimension of most tools seems thus to be caused by the dimension of this specific raw material. Another small tool is a borer of silicified sandstone of 19 mm length. A single exception is the triple-edged piece made of silicified sandstone, which is 114 mm long and has a very massive basal part.

Comparison of tool and debitage dimensions

Table 4: Dimensional values of flakes and tools not made of quartz and not made of angular debris

Quartz flakes >15 mm (n=200)			
	length (mm)	width (mm)	thickness (mm)
Mean	29,36	24,63	7,83
Standard dev.	10,74	10,87	4,01
Median	27	22	7
Tools (n= 19)			
	length (mm)	width (mm)	thickness (mm)
Mean	38,47	32,37	11,11
Standard dev.	11,11	11,80	5,90
Median	39	34	11

In order to get a better understanding of the relation between tools and debitage, the size of the artefacts has been compared. Several precautions had to be made: Only complete flakes and only tools from flakes have been chosen. There are five pieces of angular debris, which show modifications. As their measurements cannot be compared to those of flakes or blades, these tools from angular debris had to be excluded. Second, the modified pieces of quartz are all scaled pieces. As at least some of these seem to be cores, rather than tools, it was decided to take out all quartz artefacts. Finally, the exceptionally large triple-edged piece was not included, as it was far outside the standard deviation. Calculation of values with and without this piece showed, that the general trend was only less strong without this piece, but it was not changed.

Mean values, standard deviations and median values of length, width and thickness of all flakes and tools except those made of quartz were calculated (Tab. 4). It becomes obvious, that preferably large flakes were chosen for modification.

The measurements of the flakes and tools made from quartz give further information on the limitations of this raw material. The largest measurement taken from a quartz artefact is 36 mm, this is a scaled piece. Many of the scaled pieces from quartz still show remainders of the pebble cortex on both ends and can thus be judged to be representative of the size of the pebbles available. The three cores of quartz have large areas covered with a pebble cortex. Their maximum length is 24, 27 and 24 mm. The largest out of 29 unmodified complete flakes of quartz has a maximum length of 29 mm and the largest splinters from scaled pieces have a maximum length of 25 mm. To conclude, one can say that the available quartz pebbles were probably not larger than 30-40 mm in general.

Other features of tools and debitage

The locally available raw materials show different kinds of cortex. The quartz pebbles have rounded surface from water transportation. The silicified sandstone appears mostly in more or less large blocks and cobbles with coarse, withered outer surfaces. As the distance from the site to the next rocky outcrops is less than 100 m, it was not necessary to decortify the raw material.

The portion of dorsal cortex on flakes and tools was examined by sorting the artefacts into five classes (0%, $\leq 25\%$, $\leq 50\%$, $\leq 75\%$, 100%). Different raw materials were regarded separately. As a result, about 55% of the flakes > 15 mm made of silicified sandstone (n=232) show no cortex and about 12% have more than 50% dorsal cortex. With quartz flakes (n=30), the portion of cortex is much higher, which is again caused by the raw material, since the small pebbles did not allow for a decortification: Only 20% show no cortex, but over the half shows more than 50% of the dorsal surface covered with cortex.

Remarkably, the coverage of dorsal surfaces of tools made from silicified sandstone or flint is even higher than that of the unmodified flakes. Here, one fifth shows a coverage of the dorsal surface of more than 50%, demonstrating, that the covering of a flake with cortex was no reason not to choose it for modification.

This is also true for the butt surfaces: One third of all artefacts show a cortical striking surface. One fifth is plain (*lisse*), while only a bit more than 10% is faceted. This means, that most debitage was achieved without intensive preparation of the cores. Furthermore, 15% of all artefacts show rests of cortex on the distal end, which means, that in these cases, the convexity of the flaking surface was not strong enough to prevent the impact from overpassing.

To sum up, the technical traits exposed by this inventory can be characterized as rather simple. The locally available raw materials were chosen for the production of the large majority of the flakes with a rather simple flaking technology and with hard hammering technique. The largest pieces were picked out to use them as tools. Tools mostly show use-retouch and were not standardized at all. A special use might be indicated for the scaled pieces, but this remains problematic.

Bones

The bone material from this site contained bones of domesticated animals like cattle (*Bos primigenius taurus*) and sheep (*Ovis ammon*), apart from bones of gazelle (*Gazella dama*, *Gazella spec.*) and antelope (*Addax nasomaculatus*) pointing to a pastoral way of life with some complementary hunting (conf. Jesse et al. 2004: 137).

Surface collection at site 97/7

Apart from the excavation an intensive surface survey was carried out in the surroundings of the excavation, using a total station. The aim was to get a representative sample of pottery which could also be used to show spatial distribution patterns.

Pottery

Altogether 113 vessel units were found on the surface of the wadi floor. About 60% of these show plant remains and rounded sand grains as tempering agents, while about 37% show plant remains and angular and rounded sand grains.

Again, comb impressions, Bouton decoration and triangular stamps form a large percentage of the occurring decorations (conf. Fig. 3.4, 3.5). Comb impressions appear as rows of dots (15% of all vessels), as herringbone patterns (5%) or as complex geometric patterns (10%). Bouton decoration makes up 10% and

triangular impression 3,4%. Also other kinds of single impressions appear (16%), as they did in the excavation material. They can therefore be classified as belonging to the Handessi A horizon.

Thus, we can say, 60% of all the pottery found in the vicinity of the excavation area shows the same kind of decoration types, as they appear in the excavated material. Nevertheless, there is one major group of vessels, which shows a very distinct kind of decoration pattern, the mat impression. Unlike the before-mentioned decorations mat impression is usually covering the whole vessel from the rim until the base. 24 vessels or 29,5% of all vessels are decorated like this. From these, seven show combinations with single impression motifs by stamps or combs in rows or other simple impressed designs. Mat impression is one of the typical decorations of the Handessi B horizon, which followed the Handessi A horizon in time (Keding 1998, Jesse et al. 2004: 156-157). It seems therefore, that settlement on this site lasted over a lengthy period of time with probably repeated seasonal use.

Comparison of temper groups and decorations

Study of the composition of the non-plastic components of the sherds showed differences between the sherds with mat impressions on the one hand and sherds with Bouton decorations, comb impressions, and triangular stamp impressions on the other hand. The former contain a higher amount of organic material as well as more round sand grains (temper group 2a in Jesse et al. 2004), while the latter contain a lower amount of organic material and rounded as well as angular quartz grains (temper group 2c in Jesse et al. 2004). This can be interpreted as a coincidence in the change of the decoration technique as well as the tempering material over time.

Chemical analysis of the pottery

Chemical analysis of trace elements of several pottery samples from Wadi Hariq 97/7-1 and from the surface survey showed a good agreement between the samples. This can be interpreted as evidence towards local production of pottery, especially as other samples of Handessi pottery from Middle Wadi Howar showed differences to the samples from Wadi Hariq, but were consistent within that group (Klein et al. 2004: 352). Transport of pottery between different regions therefore does not seem to have occurred regularly.

Site Wadi Hariq 01/1

The site Wadi Hariq 01/1 is situated in the northern part of the Wadi system in the middle of a wadi channel. This channel opens into the large basin of site Wadi Hariq 97/8 ca. 1,5 km further to the east (presented by Kröpelin, this volume). Here the wadi floor is covered mostly by a thick layer of sand. Only in

the western part of this basin a playa sediment becomes visible under the sand and here again some frittings appear. On top of the sandy layer a large artefact scatter stretches over an area of ca. 800 m x 600 m. This scatter includes numerous stone settings which can be interpreted as the remains of fire places and tent or shelter constructions. Furthermore there are many artefact concentrations with pottery sherds, lithic artefacts, grinding stones, bones and other remains. Here, one area was chosen for excavation because it contained numerous pottery sherds and a second, smaller trench was opened around a dense scatter of artefacts, which probably represents a knapping site. We will concentrate here on the first trench with the pottery, which was called Wadi Hariq 01/1-1.

Excavation Wadi Hariq 01/1-1

A trench of 6mx5m was excavated. After removing the aeolian sand covering the site two dark patches, a larger one and a smaller one, became visible (Fig. 4). These were containing ashes and charcoal and therefore interpreted as fireplaces. Stone artefacts, bones and some potsherds were found in situ embedded in the dark grey ashy sediment of the larger fireplace. One of these potsherds shows a decoration made of mat impression. Some charred faeces of a small animal were found in this fireplace and could be radiocarbon dated to 1681±45calBC (KIA-17543: 3385±25BP). A third fireplace became visible some 3 cm below the surface. Charcoal from this fireplace was dated to 1632±48 calBC (KIA-17510: 3355±25BP). Both datings show good statistical agreement.

Pottery

Altogether 227 pieces of pottery with a total weight of 970 g were found in the excavation area, but a lot of these are smaller than 1 cm² or heavily abraded by wind and sand on one or both sides. From the total, a number of 125 sherds (total weight: 830 g) could be regrouped to vessel units, forming the rests of 17 vessels. While most of the vessel units are made up of only one, two or three sherds, three vessel units contain ten or more sherds (VU 16: 41 sherds, VU 17: 39 sherds, VU 12: 10 sherds). Many of the 41 sherds belonging to the vessel unit 16 are coming from the same square meter (Fig.4: square 23/12), including some of the bottom sherds still standing in the ground, showing that the sherds of this vessel were still lying in situ and were not moved after deposition. This may imply deposition of vessels in the settlement area for later reuse, a phenomenon that points to recurring seasonal settlement activity of nomadic people.

Technical features

The tempering materials of the pottery are very homogenous for all vessel units except one. They consist of rounded sand grains of size classes mostly below 0,25 mm or between 0,25 and 0,5 mm. Sand grains over 1 mm are rare. The organic material appears usually as negatives of burnt grass pieces or dung, mainly

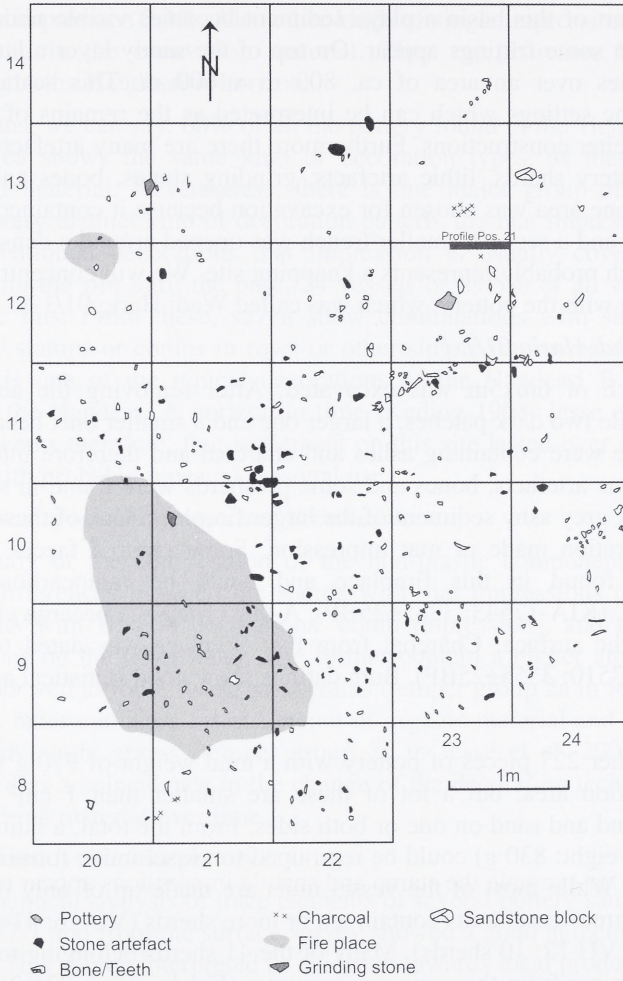


Fig. 4. Wadi Hariq 01/1-1. Excavation area after removal of aeolian sand.

mainly of small (below 2 mm) or medium (2-5 mm) sizes (temper group 2a in Jesse et al. 2004). No sherd showed any mica.

The only exception is a vessel unit showing very small angular sand grains never exceeding 0,25 mm in size and very fine organic material. Additionally, small grains of limestone (tested by hydrogenic acid) appear in these sherds. This vessel unit might represent some imported pottery, maybe from the Nile Valley.

The outer surfaces of the vessels show different shades of brown and greyish-brown, sometimes with black areas from the firing. The inner surfaces and also most of the breaks are usually black or greyish black. Thus, a reducing firing atmosphere can be proposed. Only three vessel units show light brown surfaces and oxidation zones in the breaks, resulting from an oxidizing firing atmosphere. The average wall thickness is 5 mm.

The treatment of the surfaces is usually quite simple, although a lot of sherds show traces of abrasion. In most cases the surfaces were smoothed but not burnished or polished and inner surfaces show a less careful treatment than the outer surfaces.

Vessel shapes

The vessel shapes could not be reconstructed with great success due to the bad preservation. The bottom sherds of vessel unit 16 clearly come from a rounded base. Some rim sherds point to restricted vessels with round forms. As no sherds with s-shaped profiles occur, it appears probable, that most vessels had a spherical shape.

Decorations

Most of the vessels were decorated and only three vessel units show no decorated sherds. Many of the vessel units with decorations consist of only small sherds, making it difficult to describe the decorative patterns. In several cases it is only possible to describe the decoration technique, but the pattern cannot be reconstructed. Six different kinds of decoration techniques were applied: Mat impressions (n=6), comb impressions (n=5), single stamp impression (n=3), incised decoration (n=2), spatula impressions (n=1) and roulette technique (n=1).

Mat impression and roulette technique both are applied all-over the vessel surfaces, while for example the stamp and spatula impressions appear only on the rim. All-over mat impressed decoration is combined with a row of stamp or spatula impressions at the rim on two vessels. This combination also appears very often in the pottery of the surface collection from this site (see below). The only rim top decoration was made of parallel oblique comb impressions. Below it follows a rim band with parallel oblique comb impressions. Other decoration patterns cannot be described.

Altogether, the pottery of the excavation area Wadi Hariq 01/1-1, consisting of 17 vessel units, appears as a homogenous assemblage of simple brown to grey vessels with a temper of rounded sand and organic material. Only VU 13 is apparently different, showing a very fine tempering and a red coating on the outer surface, which is unfortunately too abraded for judging whether it once was polished or not. Shapes seem to be mostly spherical and decorations are dominated by mat impressions and comb impressions. This makes it easy to

attribute this assemblage to the Handessi B Horizon. An interesting thing to note is the appearance of roulette decoration (probably twisted string roulette, determined by Maya von Czerniewicz, Cologne) on vessel unit 1 (Fig. 5), a technique which was not observed before in the Wadi Howar region. This type of decoration appears as a new element in the pottery of the Southeastern Sahara around 1700 calBC, just for the first time. Maybe it was introduced from the Kerma culture in the Nile Valley, where roulette decorations appear already in the Kerma Ancien (Gratien 1997: 397). Also mat impression appears in the Kerma culture, from Kerma Moyen onwards (Gratien 1997: 367). Thus, cultural links to the Nile valley become visible.



Fig. 5. Wadi Hariq 01/1-1, VU 3 with roulette decoration.

Lithic artefacts

The lithic artefacts from the excavation area have not yet been studied in detail. Preliminary results have been reported by Jesse et al. (2004).

Bones

The animal remains from this site were more numerous and better preserved than at site Wadi Hariq 97/7-1. Identified species include cattle, sheep and goat as domesticated species and Dorcas gazelle and Dama gazelle as wild species. This implies the same reconstruction of subsistence strategies as for site 97/7-1: Nomadic pastoralism, combined with occasional hunting (conf. Jesse et al. 2004: 153).

Surface collection at site Wadi Hariq 01/1

Apart from the excavation an intensive surface survey was carried out in the surroundings of the excavation, using a total station. The aim was to get a representative sample of pottery which could also be used to show spatial distribution patterns.

Pottery

Numerous potsherds have been collected from the surface surrounding the excavations at site Wadi Hariq 01/1 and registered with a total station. Altogether 171 sherds with a total weight of 2414 g were found at 65 locations ranging from scattered single finds to dense artefact concentrations. The sherds could be regrouped to 74 vessel units, of which 53 consist of just one sherd. The general appearance of the pottery can be described as strongly destroyed and abraded. Often only small parts of the vessel have been preserved showing just one or even no intact surfaces.

Technical features

Fabrics and burning techniques allow us to divide the pottery into two larger groups and a few exceptional pieces.

The great majority of the pottery has been tempered with rounded sand grains of usually 0.5 to 1 mm (max. 2 mm) and organic material (temper group 2a in Jesse et al. 2004). 53 vessel units or 75% of all vessels belong to this group. No mica appeared in any of these vessels. Another vessel unit also belongs to this temper group, but shows additionally small amounts of mica fragments of sizes ranging from 0,5 to 1 mm. A small group of five vessel units is also tempered with rounded sand grains and organic material, but also small grains of limestone in limited amounts.

A group of twelve vessels shows a temper with angular, opaque white quartz grains and organic material (temper group 2b in Jesse et al. 2004). The average size fraction lies below 0,5 mm but occasionally grains of up to 1 mm appear. The amount of organic material seems to be lower than in the first group. No mica appears. Again, one vessel can be added, showing the same tempering agents as the aforementioned, but also mica.

One vessel unit contains mostly angular sand grains of sizes below 0,25 mm and organic temper, but also small numbers of rounded sand grains up to 1 mm (temper group 2c in Jesse et al.). This vessel unit also has the lowest wall thickness with just 3,0 mm. Furthermore there are two vessel units which contain no or almost no organic material and a mixture of rounded and angular sand grains (temper group 1 in Jesse et al.). The average wall thickness is 5,7 mm, no differences between the different temper groups exist. Almost all sherds have a black or dark grey fracture colour and oxidation zones appear in less than one third of the cases. The sherds thus seem to have been burnt not very intensively (Nicolson 1993: 105).

The surface colours and the treatment of the surfaces also do not show any differences between the different tempering groups. Surfaces were smoothed in a simple way and no polishing occurs. The outer surfaces were treated more carefully than the inner surfaces: The outer surfaces show traces of smoothing in 15% of all cases, the inner surfaces in 75%. Coating of the surfaces appears in only five cases. Surface colours are dominated by brown (outside: 60%; inside 34%) and grey to black (outside: 30%; inside: 60%) colours, light brown or ochre colours being rare. The few vessels showing a red or reddish brown to light brown colour are coated.

To sum up, it can be stated that the collected pottery from site Wadi Hariq 01/1 shows rather homogenous technical features. It can be classified as a simple use ware with more or less carefully smoothed surfaces made of a ferruginous clay tempered with sand and organic material, burnt at a moderate temperature. Two main groups can be distinguished by their tempering agents, one showing rounded sand grains and organic temper, the other showing angular sandgrains and organic temper.

Vessel forms and rim tops

Only in a few cases vessel forms could be reconstructed, due to the overall bad preservation of the pottery. In most cases only small rim sherds or just only wall sherds are preserved. Simple globular vessel forms prevail, ranging from open bowls (n=6) to restricted vessels with more (n=2) or less (n=7) strongly inverted rims. Only one vessel has an s-shaped profile and one has a straight rim attached on the shoulder. In one case sherds could be identified safely as bottom sherds, belonging to a round base. Rim top forms include rounded (n=11) and flattened examples (n=6). The appearance of the different kinds of rim top forms is not correlated to any kind of vessel shape.

Decorations

Of 74 vessels only 8 are not decorated. The position of the decoration on the vessel can be divided into decorations restricted to the rim zone, decorations

on the rim in combination with all over decoration of the whole vessel and all over decoration of the whole vessel with no special rim decoration. Only one vessel has a rim top decoration, showing a criss-cross pattern made of incised lines (Jesse et al. 2004: Fig.14.).

Decoration techniques

Altogether nine different decoration techniques could be observed. These are: 1. Incision, 2. Single spatula impression, 3. Spatula impression in rocker technique, 4. Single comb impression, 5. Comb impression in rocker technique, 6. Single stamp impression, 7. Bouton decoration, 8. Mat impression technique, 9. Roulette technique.

Table 5: Frequency of decoration techniques

decoration technique	Wadi Hariq 01/1							W. Hariq 01/1-1	
	wall	%	rim	%	rim top	sum	%	sum	%
Incision	12	22,2	3	8,3	1	16	17,6	2	11,8
Spatula, single impr.	1	1,9	1	2,8	0	2	2,2	1	5,9
Spatula, rocker technique	1	1,9	0	0,0	0	1	1,1	0	0
Comb, single impr.	22	40,7	12	33,3	0	34	37,4	5	29,4
Comb rocker technique	2	3,7	0	0,0	0	2	2,2	0	0
Stamp impression	2	3,7	12	33,3	0	14	15,4	3	17,6
Bouton-technique	0	0,0	3	8,3	0	3	3,3	0	0
Mat impression	13	24,1	5	13,9	0	18	19,8	6	35,3
Roulette-technique	1	1,9	0	0,0	0	1	1,1	1	5,9
Sum	54	100,0	36	100,0	1	92	100,0	17	100,0

These techniques appear with different frequencies and different motifs on the rims and walls of the vessels. Comb impressions are the most frequent decoration technique, appearing on 40% of the decorated walls and 33% of the decorated rims (Tab. 5). Only mat impressions are comparatively frequent on decorated walls and rims with 24% and 14%, whereas other techniques appear either frequent on walls or on rims, or are not frequent at all. For example, stamp impressions appear on 33% of the decorated rims, but only on 3,7% of the walls, and bouton decorations appear on rims only (8,3%). These two decoration

techniques are thus typical rim decorations. Incisions, on the other hand, appear much more frequently as wall decorations (22%) as on rims (8,3). All other decoration techniques (spatula impressions, comb rocker technique and roulette decoration) appear only in few cases.

A comparison with the decorations of the pottery from excavation area Wadi Hariq 01/1-1 shows some strong similarities between the two assemblages, which are part of the same site. In both cases comb impressions and mat impressions form the most frequent part, followed by stamp impressions and incisions. Techniques, which are less frequent in the collected assemblage, like spatula impressions or roulette technique, are infrequent in the excavation material as well. Bouton decorations and comb and spatula impressions in rocker technique, which are infrequent in the collected material, do not occur at all. Thus, the pottery from the excavation area is representative for the site as a whole. Furthermore, also the assemblage from the collection appears as quite homogenous, suggesting that the collected pottery from Wadi Hariq represents a rather limited period of time.

Motif elements

The variety of motifs is comparatively high with 53 motif elements on 66 decorated vessels. In other words, almost every single vessel shows another decoration. Nevertheless, it is possible to reduce the different motif elements to a number of groups with apparently similar motif elements. The most frequent motif elements are incised crosshatched bands (n=10), with or without restricting lines and in two cases in combination with incised lozenges with crosshatched filling. Further lozenges appear in comb impression technique (n=5).

Of the 14 vessels showing a mat impression, five have a rim decoration with a single horizontal line of impressions of irregular stamps (Fig. 3.7) (conf. Jesse et al 2004: Fig. 15.1). It appears that these are a very common type of decoration of Handessi B pottery. The same impressed lines appear on two vessels without any further decoration, both of these showing two lines. Another large group of distinctive motifs are the herringbone patterns made of comb impressions, which occur on seven vessels.

Six vessels show lines of triangular stamp impressions, typical for the so-called Handessi A-Horizon, and in four cases combined with comb impressed decorations. Single horizontal lines of bouton decorations, again characteristic of the Handessi A-horizon, occur on three vessels, all of them in combination with further comb impressions. Further distinctive motifs are a pending filled triangle, made of incised lines, characteristic for both the Kerma-culture and the C-Group and chevron bands of incisions (n=3) or comb impression lines (n=2).

All in all, the majority of the pottery can be attributed to the Handessi B phase, while some sherds with the Bouton decoration and the triangular impressions point to a longer settlement history of this site, already beginning in Handessi A phase.

Comparison of temper groups and decorations

An interesting result came out from the comparison of the two main temper groups and the prevalent motif elements occurring on the vessels within these groups. The larger temper group, consisting of vessels with rounded sand grains and vegetal material (temper group 2a), contains all the vessels with mat impressed decoration and crosshatched incised decorations, while the other major group with angular grains (temper group 2b) contains two of the three vessels with bouton decoration. The third vessel with bouton decoration, is also tempered with angular sandgrains and vegetal material but contains a small amount of rounded sand grains as well. Most other vessels of temper group 2b are decorated with comb impressions in various motifs and thus are not distinctive from temper group 2a. As we know boutons as an older decoration type of the Handessi A phase and mat impressions as a younger technique, typical for Handessi B (Jesse et al. 2004; Keding 1998), this can be best explained as a chronological phenomenon, marked by a coincidence between the change of a tempering agent and a related decoration technique.

Vegetal remains

Among the pottery sherds from the surface collection was one sherd containing seed imprints of wild grasses, probably belonging to a species of Paniceae. This might suggest that collecting wild grass seeds was an option to enlarge the spectrum of subsistence strategies.

Conclusion

Excavations and samplings have been carried out in two different basins of the Wadi Hariq. 14C-dates from the excavated sites show that these are separated by probably at least three centuries. Further evidence can be drawn from the different stratigraphical positions of the two sites. While the find layer of Wadi Hariq 97/7-1, 14C-dated to around 2100 calBC, is partly embedded into a playa sediment, Wadi Hariq 01/1-1, dated to about 1700 calBC, is found on a thick layer of sandy deposits (ca. 1 m), which cover a playa.

Pottery with geometric decorations of the kind described here has been found in other regions of the Eastern Sahara as well, like the Laqiya region to the north and the Wadi Howar to the south. They have been initially described from Wadi Shaw (Francke 1986) and they have been characterized as one archaeological pottery horizon by Keding (1998). For this horizon now the name

“Handessi Horizon” is proposed (Jesse: this volume, Jesse et al. 2004). The pottery samples coming from the excavations and surface collections of the two sites have each shown different amounts of the decoration types. The pottery from the older excavation site, Wadi Hariq 97/7-1, is characterised by Bouton decorations, triangular stamp impressions and comb impressions in different motifs like herringbone patterns and geometric designs. The younger site, Wadi Hariq 01/1-1 is dominated by mat impressed pottery, which is a new decoration technique in this region, just like the roulette technique. Comb impressions occur in various geometric patterns again, but Bouton decorations do not appear any more and triangular impressions just once. These inventories therefore contribute to the understanding of the development of decoration styles in the Handessi Horizon and to the chronological subdivision of this archaeological group.

In the samples from the surface surveys this trend is less clear, surely due to an accumulation of finds from repeated settlement over a longer period of time. In all probability both basins of the Wadi will have been used for settlement over the same period of time, but preservation conditions changed the deposits and surely had an influence on the database. Site preservation was exceptionally good at site Wadi Hariq 01/1-1, where the remains of fireplaces and deposited vessels with the bottom sherds still in situ had been covered by layers of windborne sand, while at Wadi Hariq 97/7-1 the erosion had taken away the covering sand and exposed the find-bearing playa layers to abrasion.

Bone finds from the two excavations indicate a pastoral way of life. Nevertheless the herders took the chance to hunt antelopes and gazelles from time to time (Jesse et al. 2004: 153). From Neumann’s reconstruction of the vegetation and climate of the Eastern Sahara by archaeobotanical remains we can conclude that around 2000 calBC a year-round stay in the region of Wadi Hariq was impossible (Neumann 1989: 146). Therefore we must imagine the dwellers of Wadi Hariq as nomadic pastoral herders.

The nomadic way of life is also expressed by the archaeological finds. Both pottery and lithic artefacts represent a local production of goods necessary for daily life. In the case of lithic artefacts, production was simple and opportunistic, relying on local resources and using a simple technique. Large amounts of raw material were exploited, while only few artefacts have been chosen for further work, resulting mostly in use-modification and irregular edge-retouch. Pottery also was produced from local sources, as seems to be indicated by chemical examination of trace elements (see above) in potsherds from site 97/7. Pottery vessels were not transported but left on the site, where they were reused in the next season. This phenomenon is also observed among modern pastoral herders, as for example the Himba of Namibia (pers. comm. M. Bollig, Köln).

Some of the typical elements of the pottery decoration can also be found in the pottery of the Nile valley, like the Bouton decoration in the Kerma culture, or the geometric designs with lozenges and chevrons and triangles in the C-Group or the coating of the pottery with a red slip. Mat impression and roulette technique have to be mentioned also. On the other hand, there is no typical Kerma-pottery like beakers or red-polished ware. We can thus assume that the people of the Handessi Horizon in the desert had some ideas about pottery making and decoration in common with the people of the Nile valley. This would support the idea that there was contact between these two areas.

Sites of the Handessi A Horizon have a distribution from the Laqiya region in the North to the Lower Wadi Howar in the south. Until now no other archaeological culture dating around 2200 calBC has been found in the desert west of the Nile. We therefor can propose that the finds of the Handessi Horizon in its earlier stage, Handessi A, represent the material culture of the Temehu, as they are mentioned by Herchuf in the report on his third journey to Yam (Edel 1955: 52, 68-69; 1967: 156-157).

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