

Reports

Prehistoric investigations during the 2017 archaeological survey of the EDAR Project in the Eastern Desert along the Lower Atbara, Sudan

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An Overview of Atbara river archaeology

There is general agreement among archaeologists working on Sudan's prehistory that results of comprehensive research in central Sudan have encouraged the extension of fieldwork into areas beyond. The Eastern Sudan is one area lacking investigation. The earliest description of the area comes from Crowfoot (Crowfoot 1911). After Crowfoot there was no archaeological fieldwork undertaken in the area, though individual sites were mentioned by travellers to the region: Kirwan in the 1930s, Sandison in the 1940s and Delany in the 1950s. The exploration of the so-called 'Island of Meroe' improved our understanding of areas east of the Nile in general, an area where many Kushite sites have been investigated (Crowfoot 1920; Hintze 1959; Hinkel 1977; Bradley 1992).

Stone Age data recovered from central Sudan, and the results of Arkell's and Whiteman's explorations led scholars to establish many projects researching cultural expansion to the east. This resulted in the discovery of many Late Prehistoric sites in western Butana, such as at Shaqadud (Otto 1963). The joint project of the University of Khartoum and Southern Methodist University documented many Late Prehistoric sites (Marks *et al.* 1980, 32). In addition excavation and extensive survey of the western Butana revealed a stratified Late Prehistoric archaeology and allowed for comparison with Neolithic archaeology in central Sudan (Marks and Mohammed-Ali 1991). The Italian mission explored the eastern part of the Butana, which is also close to the river Atbara, and some sites were recorded near Khashm el-Girba (Fattovich and Piperno 1981, 27).

Archaeological investigations of the Atbara Valley began with the combined efforts of both projects noted above, the results being published under the title *The Archaeology of the Eastern Sabel* (Fattovich *et al.* 1984).

The first information about the Atbara Valley specifically came from geological research (Abdalla 1955; Matuck 1975 in Salih 2005). The area is characterised by exposed rocks of the Precambrian basement complex, which contains schists, sediments, marble, quartzite, chlorite and epidotic (White-

man 1971, 47). Berry and Whiteman (1968), studying the geological sections exposed on the east bank of the Atbara, demonstrated that the river cuts into a thick series of sands, gravels, and clays exposed from the Butana Bridge up to the plains extending towards the Kassala area in the upper part of Atbara Valley (Whiteman 1971, 47).

Prehistory in the upper part of the Atbara Valley was first known from surface finds discovered near the towns of Khashm el-Girba and Halfa Eljadida (Arkell 1949; Hintze 1959; Otto 1963; Whiteman 1971; Shiner and Chmielewski 1971). To these may be added fossil mammal bones and Early Acheulean stone tools from a '33-feet high' terrace of the Atbara on the left bank upstream of the Butana Bridge (Arkell 1949, 35). Shiner and Chmielewski documented 22 archaeological sites in late 1967 from an archaeological survey, and some test excavations were conducted in the area south east of Khashm el-Girba (Shiner and Chmielewski 1971). The sites fall into five groups; The Acheulean, Late preceramic, Saroba, Butana and El Hagiz groups. These data, from the surface and the sections exposed by erosion, provided new evidence for the extension of Early and Late Prehistoric archaeology in the upper Atbara. Rescue fieldwork continued around Khashm el-Girba in the Paleolithic sites noted above (Chmielewski 1987), with some of the sites described as Late Acheulean and Middle Stone Age. This period was followed by extensive archaeological fieldwork in eastern Butana over a long period and many Late Prehistoric sites were investigated and compared with those in central and eastern Sudan (Marks *et al.* 1987; El-Amin 1987). The Late Neolithic sites and many cultural groups recorded around Kassala heightened the importance of the area for Stone Age research, and added a different regional Neolithic zone to Sudan's archaeology, research which is still ongoing (Fattovich 1993; Manzo 2012; 2015).

In spite of these discoveries in the upper part of the Atbara Valley the lower part remained unstudied for a long time. Single artifacts were described, such as the Early Paleolithic handaxes collected from Khor Hudi by Wayland and published by Arkell (1949, 34). Of the Late Stone Age sites discovered and studied close to Atbara town on the right bank of the Atbara river, the main site, Abu Darbein, has stratified Late Prehistoric archaeology dating to the Neolithic (Haaland and Magid 1991, 39).

Recent archaeological exploration in the middle part of the Atbara Valley examined Middle and Late Pleistocene deposits. This research has revealed fossils and single bifacial artifacts from the Atbara river sections similar to the Early Stone Age archaeology in East Africa (Abbate *et al.* 2010). More recent discoveries of the Early Paleolithic sites in the lower part of Atbara show the potential of the area for Stone Age research, which was the reason for the establishment of the project reported upon here (Nassr 2014). In addition, the latest discoveries of Acheulean sites in the south Red Sea coast region of Sudan encouraged research along the Atbara and in the Eastern Desert to enable a better understanding



of the early human transition from East to North Africa (Beyin *et al.* 2017).

Results of previous research along the Atbara river and in adjacent areas gave our project added significance as it filled the current gap in knowledge of the Atbara Valley during the Stone Age, and allowed for the creation of new hypotheses concerning early cultural transition. This included the debate concerning the 'out of Africa' route along the Atbara Valley and the Red Sea coast. In conclusion, the justification for our project 'Stone Age research in the Eastern Desert of Lower Atbara river' is to re-evaluate Sudan's Stone Age archaeology from the perspective of a new region.

Archaeological survey 2017 (EDAR project)

Following on from the results of many decades of archaeological activities in eastern Sudan, the Atbara Valley holds a critical place in Stone Age research because it hosts some of the oldest cultural records in the region. The lower Atbara river and the Eastern Desert are also considered the primary source of those Early and Late Prehistoric groups that populated other regions during the Pleistocene and Holocene epochs (Nassr 2014; 2017, Manzo 2015). Although Stone Age research in Sudan started early, there was a lack of Pleistocene sites and little was known about the early Holocene in general. Furthermore, archaeological research focused on the Nile banks and little work was undertaken to the west and east and the Atbara Valley received little interest or attention. Currently, the questions of when and through which geographic routes early African cultures dispersed out of East Africa justify research on the Atbara river as it may have provided a conduit through Sudan from East Africa to the Red Sea littoral (Abbate 2010; Beyin *et al.* 2017, Masojć *et al.* 2017).

Our research started in the lower part of the Atbara Valley on the east river bank in 2013 with the exploration of Paleolithic sites first noted by Arkell with his discovery of single handaxes collected from the Hudi depression (Arkell 1949, 34). Here our exploration documented five Paleolithic sites on the river bank and one in the desert (site EDAR06) (see Nassr 2014). In late 2014 one test excavation was conducted on site EDAR06 and stratified Acheulean stone tools were found. In 2015 a joint Sudanese and Polish team excavated one trench at site EDAR06 in order to begin the comprehensive field research project in the area discussed above. This resulted in the creation of the EDAR project, a joint project of the University of Neelain and University of Wrocław, Poland on Stone Age archaeology in the Eastern Desert adjacent to the Lower Atbara river. In late 2016, the first season of archaeological survey and reconnaissance in the area began, funded by the Ministry of Higher Education and Scientific Research (MHERS), Sudan. One hundred and thirty four archaeological sites were discovered to the south of Atbara town, on the right bank of the Atbara river, and eastwards into the desert plateau, over a distance up to 80km (Nassr 2017). The sites recorded differed in their location

and type. The expansion in the number of sites known gives support to the project's aims. At the same time joint research on Paleolithic sites in the desert funded by the Polish National Science foundation was carried out (Masojć *et al.* 2017). In 2017 the second season of archaeological survey, funded by MHERS, focussed on the systematic survey of two areas (Hudi depression and Atbara Paleo-lake). The season's goals were as follows:

- a) To locate new archaeological sites in the area,
- b) To investigate Pleistocene archaeology in the Hudi Depression following on from Arkell's finds and the Holocene archaeology associated with the Atbara Paleo-lake, to allow comparisons with East Africa,
- c) To determine the time-span of prehistoric human settlement in the region and compare the data with other regions of Sudan,
- d) To assess the location of sites and artifact distributions by systematic survey in relation to the geomorphology of the area.

The archaeological exploration and systematic survey of September 2017 was in two areas along the Atbara river. The survey briefly investigated the Hudi Depression east of the river up to a distance of 25km, and the western margin of the Atbara Paleo-lake, about 40km from the river, in order to evaluate their potential for a long-term study of Stone Age archaeology. The methodology employed involved vehicle-assisted systematic foot-survey supported by our prior research experience in the region; the geomorphology was our main guide in establishing primary target areas for survey. Hence in selecting survey areas along the channel's banks or depression margins, the team employed a judgmental sampling strategy focusing on low outcrops adjoining alluvial plains, and channel terraces. The exploration recorded 10 new archaeological sites in the region from Hudi to El-Hilgi Depression (Figure 1). The antiquities documented spanned from the Paleolithic to the Neolithic and included graves covered by tumuli and salt heaps. Five sites have been selected for detailed systematic survey: three show high concentrations of Acheulean stone artifacts along the Hudi Depression; Late Stone Age sites were found on the western margin of the Atbara Paleo-lake; and tumuli were documented on the Hudi chert mounds along the eastern bank of the Atbara.

Early Stone Age archaeology along the Hudi Depression

In a large exposure in a Hudi chert gully overlooked by some outcrops, our archaeological survey discovered two rich and characteristic sites.

Site EDAR138: The site was situated on the northern bank of the Hudi Depression about 13km east of the current Atbara river valley. The site is an elongated pediment-like sediment platform, composed of fragmented chert rocks and Pleistocene deposits. An abundance of Paleolithic stone artifacts was observed on the surface of high Hudi chert mounds and in the channel sections.



Figure 1. Archaeological sites discovered during the 2016 and 2017 surveys in the Eastern Desert adjacent to the lower Atbara river (drawing: Jadain 2017).

Artifact find spots were recorded using GPS, the primary contexts were described, and diagnostic artifacts were collected for detailed classification (Plate 1).

Due to the large spread of stone artifacts, over an area of 540 x 250m, our strategy focused on the description of the general characteristics and location of artifacts. The stone

artifacts indicate that this was a large Early Stone Age habitation. Handaxes with different shapes were dominant; some chopping tools, cores, flakes and a small knife and scrapers were also recovered (Plate 2). These are Acheulean tools, typical mode 2, handaxes being the most common along with bifacial points, scrapers and discs. This material shows similarities with Acheulean stone artifacts in the Nile Valley



Plate 1. Documentation of Acheulean stone artefacts from site EDAR138.



Plate 2. Large Acheulean stone chopping tools from site EDAR138.



and East Africa such as at Khor Abu Anga, Buia, EDAR06 and Hayna (Arkell 1949; Abbate *et al.* 1998; Nassr 2014; Beyin *et al.* 2017).

Systematic survey was undertaken over an area 300 x 300m to ascertain the site's chronology. The stone artifacts recorded comprised 227 tools and more than 120 lithics – cores, flakes and debitage. The stone tools show many Early Stone Age characteristics. Handaxes were the main elements (118 examples), 51 were chopping tools of different sizes and end reduction methods, 17 were scrapers distinguished by their oval shape and sharp edges made on large cutting flakes and 11 were discs, bifacial with large flaking scars and cutting edges. There were also two cleavers and 15 points, some were bifacial and others Levallois points. The typical handaxe mode 2 was the most common stone tool, distinguished by large flaking scars and a sharp cutting edge (Plate 3).

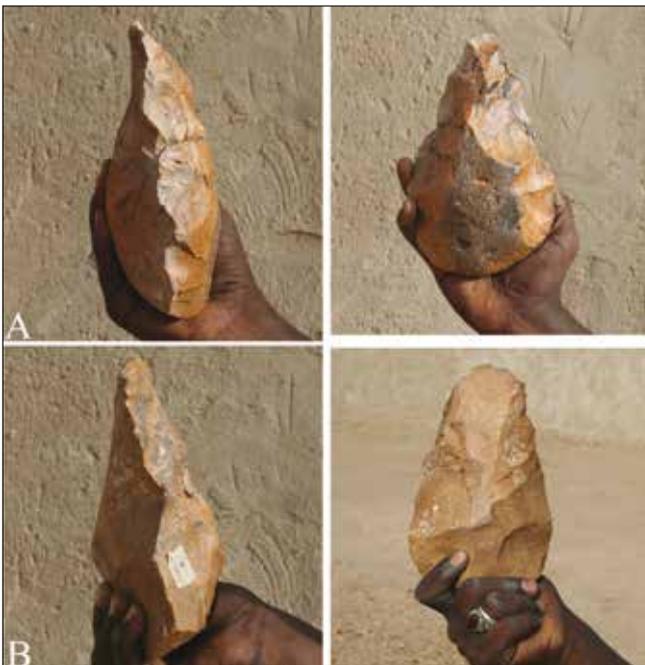


Plate 3. Typical Acheulean handaxes from site EDAR138.

In addition, intensive survey was conducted in an area of 20 x 20m, which revealed that different categories of Acheulean stone tool technology are possibly in a primary context. Cores, flakes and debitage were documented in the concentration of bifacial stone tools. Surface cleaning of an area 5 x 5m recovered 62 lithic artifacts, with many technological and typological characteristics of Acheulean and Levallois tools.

Site EDAR143: During our extensive survey along the Hudi Depression to the east, about 15km from the river bank and 2km from site EDAR138, another concentration of Paleolithic stone tools was recorded. The site was overlooked by hills of Hudi chert about 300m north of the channel bank. Acheulean artifacts were recovered from the contact zone between the surface of the chert ridge and the alluvium, or older playa deposits transitional to the alluvium.

Acheulean stone tools were documented and measured

from an area of 320 x 250m. The same strategy was employed as on site EDAR138. Handaxes of mode 2 were the main category of finds recovered here, as well as many MSA artifacts such as Levallois points. The site's setting and the bifacial stone tools scattered on the surface are indicative of small-scale Acheulean occupation on the banks of the Hudi Depression (Plate 4). Artifacts taxonomically affiliated with the Acheulean, also the presence of many Levallois points and



Plate 4. General view of Early Stone Age archaeology from site EDAR143.

Levallois flakes, indicate the presence of MSA archaeology, which will be helpful in future in understanding the transition from Early to Middle Stone Age in the area.

Late Stone Age archaeology in the Eastern Desert

The archaeological survey in late 2016 (Nassr 2017) revealed many Late Stone Age sites in the area differing in chronology and context. This season aimed to make systematic survey of selected sites in order to understand the sub-diversities of Late Stone Age archaeology in the area.

According to the archaeological map of the area based on the 2016 and 2017 surveys, there are 154 sites documented, 30% of which provided Late Stone Age archaeology recorded in different geographical zones. Our strategy was to test one site from each zone.

In the eastern part of the concession, site EDAR18 was chosen. The site, overlooking a debitage workshop, lies on

a sand dune in the middle of a sandy plain divided by small channels between Jebel Elgrian and Jebel Elzahatiap. Quartz and rhyolite debitage densely covered the surface over an area of 500 x 500m. We have so far obtained concentrations of microlithic artifacts and debitage. Bones, cores, flakes and denticulate stone tools are common. The site was a large settlement of an Epipaleolithic group, with quartz knapping places and sharp microlithic artifacts. This Holocene material shows some difference from Late Stone Age antiquities in central Sudan, but is similar to the Late Paleolithic archaeology which has been recorded in the upper part of the Atbara Valley (Preceramic sites and Terminal Paleolithic sites) (Marks *et al.* 1987; El-Amin 1987).

South of the Abu Adar Depression (an area examined in 2016), there is a large desert area called the Hanfar Desert, where our survey recorded Neolithic site EDAR25. This season it was decided to make systematic survey and a 1 x 1m test excavation. The site is located on a small gravel ridge elevated *c.* 2.5m above the floodplain. The ridge seems to have been part of a paleo-channel bank. Concentrations of lithics, pottery sherds and bones were visible on the surface. The test excavation revealed stratified Late Stone Age artifacts at a depth of 400mm. The artifacts collected from the excavation include Neolithic material. The diagnostics are rocker-stamped pottery sherds of esh-Shaheinab type and denticulate stone tools. These characteristic finds indicate the presence of a Neolithic site similar to the Khartoum Neolithic in the upper Atbara Valley and the Eastern Butana, which is termed Saroba culture (Fattovich *et al.* 1984, 179). In addition our systematic survey of 30 x 10m recovered a variety of artifacts from the surface (see Table 1).

Late Stone Age archaeology in the western margin of the Atbara Paleo-lake

Our survey here has recorded many archaeological sites since 2016, some of them on the banks of the El-Helgi Depression and others found to the east behind sand dunes. Site EDAR47 was selected for systematic survey this season.

The site's topography is very complicated. It consists of Holocene sediment profiles extending for 300 x 200m on the margin of huge sand dunes in a curved line (Figure 2).

The surface of the site consists of dark Holocene soil which has been completely eroded away except for 16 sediment profiles and artefacts deposited on the highest part of the site. The site appears to have occupied a mound of sediment on the margin of the lake in early and middle Holocene times. In later times, with increased aridity and erosion, the site's topography has changed; the sediments have been removed by strong winds and rain in some places, in others profiles of silts survive in some cases covered by sand dunes. Nowadays the site survives as an eroded area with some profiles and artefact concentrations in many loci (Plate 5 A-B).

Our strategy involved a systematic survey in order to document the artifacts from the surface, those which have already been disturbed by erosion. The survey team marked the artifact concentrations with flags, described and tested the artifacts from the exposed sediment sections in a subjective erosion manner.

Stone tools, debitage, pottery sherds, concentrations of shells, individual bones, semi-complete animal skeletons laying on the surface and human bones were recorded. The



Plate 5. Diagnostic artifacts from the surface and sediment profiles from site EDAR47.

Table 1. Artefacts documented from the surface of site EDAR25 in an area of 30 x 10m.

Core of flake	Core of blade	Flakes	Blades	Debitage
25	8	20	10	16
Levallois Points	Denticulates	Arrowheads	Scrapers	Grinder stone
3	16	9	15	4
Pottery sherds	Bones of wild animal	Bones of domesticated animal	Fish bone	Shells
21	7	4	3	4

characteristic artifacts are microliths, crescents with backed denticulate, sharp blades, blade cores, polished axes and fine pottery sherds with incised dots and line decoration (Plate 5 C-D).

The material classification indicates two horizons of Late Stone Age archaeology on the site. Microlithic stone tools indicate Epipaleolithic occupation in the area, which is unknown in central Sudan and is more similar to the surface material which has been discovered in the upper part

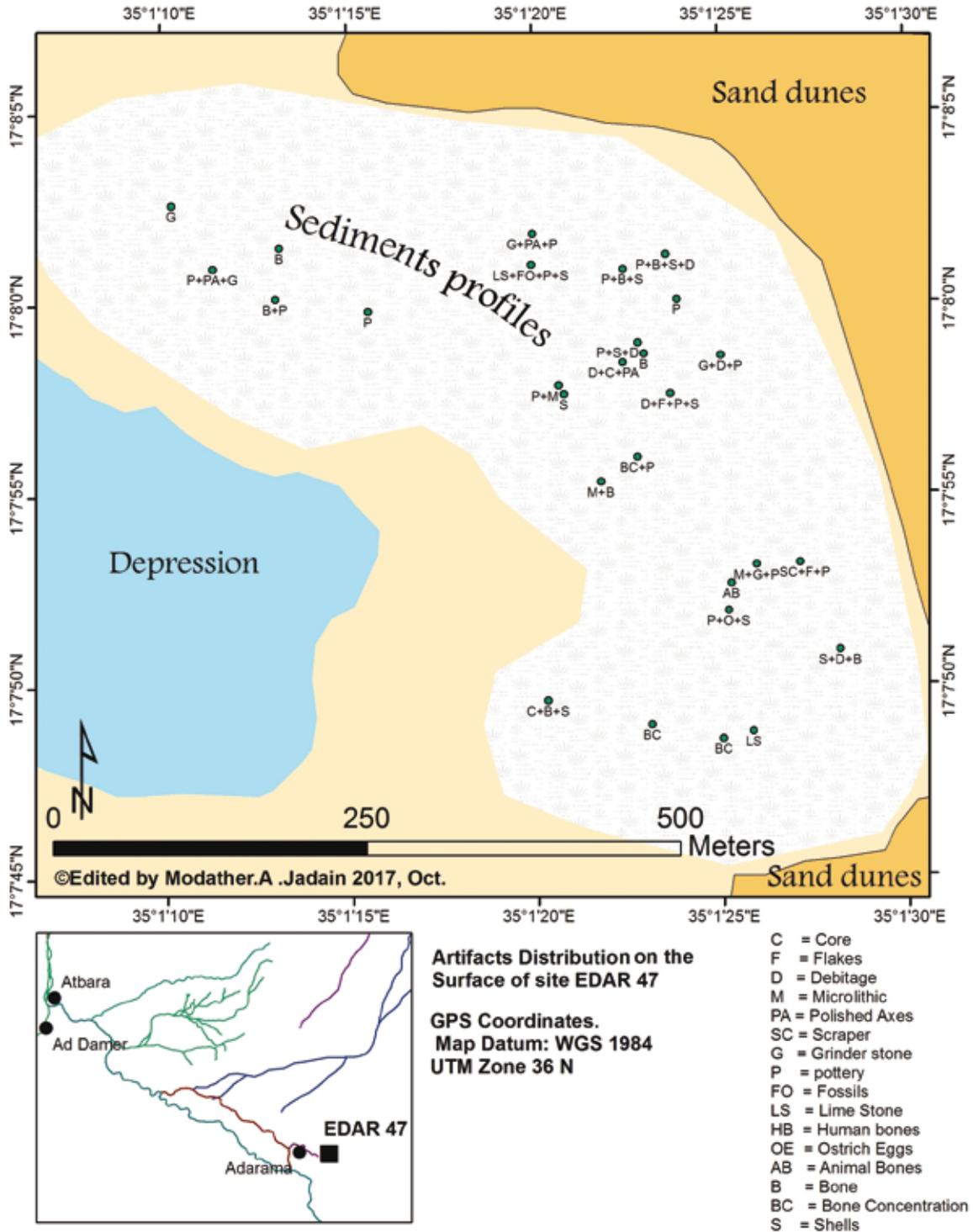


Figure 2. Systematic survey and topographical map of site EDAR47 (drawing: Jadain 2017).

of Atbara river and in the Eastern Butana (see Marks *et al.* 1987; El-Amin 1987; Fattovich *et al.* 1984). The later artifacts indicate Late Neolithic occupation in the area, recognized by fine pottery sherds with incised line decoration and polished stone axes, and also revealed the presence of Late Neolithic and post-Neolithic groups similar to those in eastern Sudan, such as in the Gash and Kassala Groups and at some sites recorded in the Atbai desert of the Red Sea Hills (Sadr 1988, 383; Manzo 2015, 236).

The exploration and artifact classification of the southern part of the area indicate that this area was occupied for a long time by different groups. The sites documented were very promising; those which contain artifacts with organic material, will be suitable for absolute dating and reconstruction of the paleo-environment of the Late Stone Age.

Kushite archaeological sites

During the general survey of the area and the systematic sur-

vey of Stone Age sites, there were many remains considered to be of later periods. These sites were fully documented on the surface. They contained artifacts dating over a long chronology (Meroitic, Post-Meroitic, Christian, and Islamic). These sites are more frequently located on the river bank but some are found in the desert, along with Stone Age remains. A range of different site types were identified. Small camps of Meroitic pastoralists were recorded along the Abu Adar Depression, as observed from scatters of pottery sherds and traces of rocks, debris of pastoral camps situated close to circular *bafirs* (water reservoirs). The tumuli are the main features which are recorded on the river bank and in the desert, with more concentrated along the river on the rocky mounds. Different types of graves were documented. Meroitic graves were marked by oval tumuli and stone ring superstructures. Post-Meroitic tumuli are the dominant type, some of them with very large superstructures while others are small and circular in form (Plate 6).



Plate 6. Tumuli at site EDAR122.

Some of the graves are related to the Christian and early Islamic periods. They are distinguished by their rectangular superstructures. Moreover, there is plenty of evidence for salt production; heaps are recorded on the river banks with a mixture of many pottery fragments and traces of Christian and Islamic settlements nearby. The ruins of settlements were also documented close to the current villages.

Conclusion and general remarks

The discoveries during the 2017 season of archaeological survey in the area east of the lower Atbara added new and rich sites. Finding an abundance of Early Stone Age sites close to the river bank sheds valuable light on the importance of the area for early human habitation. The stone artifacts from sites EDAR138, EDAR143 can be related to the Acheulean stone tool technology and typology. The location of the sites indicates that they may be contemporaneous with a period of increased *wadi* activity. Stone artifacts were made from the chert type Hudi formation, which is hard and forms a sharp cutting edge. The large stone cutting tools, choppers, discs, cleavers and handaxes, are typical Acheulean mode

2 as widely observed in African archaeology (Barham and Mitchell 2008; Torre 2016).

The result of systematic survey in both of these Early Stone Age sites showed that the dense artifact spread on the surface and its inclusion of cores, flakes, debitage and tools, is indicative of a primary context for these early Paleolithic sites. Future excavations offer the possibility of finding stratified materials. On the basis of our primary classification of artifacts many Levallois reduction technologies were recognized (Levallois flake, Levallois point and classical Levallois core) which also give the impression of multi-period occupation in the area by Acheulean and MSA groups. The bifacial stone tools from both sites are similar in their technology and chronology to some Sudanese final Acheulean and early MSA, including material from Khor Abu Anga, sites 047, 052 in the middle Atbara Valley and site EDAR06 east of the lower Atbara and Hayna on the Red Sea coast (Arkell 1949; Abbate *et al.* 2010; Nassr 2014; Beyin *et al.* 2017, Masojć *et al.* 2017). At the same time there was the emergence of simple chopping, cutting (large discs) and scraping tools indicative of some differentiation from the other sites known in the Nile and Atbara Valley.

The Late Stone Age sites identified show three horizons, which represent the Holocene archaeology in the area. Site EDAR18 shows typical Microlithic material; the concentration of sharp blades, denticulates and chips relates to terminal Paleolithic archaeology similar to that which is termed Epipaleolithic and Early Neolithic in Northern Sudan, in el-Ga'ab depression, and Preceramic and Terminal Paleolithic in eastern Sudan (Marks 1970; Tahir and Nassr 2015; El-Amin 1987). In addition the stratified material from site EDAR25 indicates an Early Neolithic presence in the area. The pottery sherd characteristics of texture, surface treatment and decoration are more similar to the Neolithic in eastern Butana (Saroba phase) and the stone artifacts – simple arrowheads, sharp scrapers and crescents, can also be found on Early Neolithic sites (Fattovich *et al.* 1984).

The systematic survey of site EDAR47 suggests that the sites recorded on the margin of the Atbara Paleo-lake, with microlithic and Neolithic artifacts in compact Holocene sediment profiles, indicate that extensive groups of Late Prehistoric people occupied the western bank of the lake. These sites have all been affected by recent erosion and some parts are covered by sand. The material samples from the systematic survey, found in the sediment profiles, contain wild and domesticated animal bones, fine Neolithic pottery sherds, microliths and polished axes, which indicate Neolithic occupation on the site.

The artifacts documented at site EDAR47 are characterized by fine pottery sherds decorated with geometric patterns similar to the Neolithic groups in the eastern Butana and upper Atbara river (Fattovich *et al.* 1984; Sadr 1988; Manzo 2015). Stone tools identified from the site consist of small backed denticulates, sharp blades, polished axes and groundstone tools, plus a large amount of shells and bones



of domestic and wild animals. The characteristics of this site are also similar to the Late Neolithic in central Sudan (Reinold 2008; Salvatori 2012; Nassr 2015).

The artifacts found by systematic survey and test excavation at sites EDAR18, EDAR25 and EDAR47 show that the area of the lower Atbara river was occupied for a long period during the Holocene. This was also apparent from an observation of the sediment profiles. The sites documented here are very promising and contain both artifacts and organic material. The data recovered from the 2017 season has made it possible to reconstruct the archaeology of the Stone Age and the paleo-environment in the lower part of the Atbara valley.

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