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PREHISTORIC ANIMAL REMAINS FROM THE EASTERN DESERT OF THE LOWER ATBARA RIVER (EDAR)

INTRODUCTION

Systematic archaeological surveys and excavations conducted in the Middle Nile region and other surrounding areas showed an important evidence of environmental changes and cultural developments during the various climatic fluctuations of late Pleistocene and early Holocene (Usai 2016). Several archaeological studies recognized that the late Prehistoric times have been associated with many major environmental changes, which made a great impact on human groups (Sadig 2013: 29–30).

The study area is located in Eastern Desert of the lower Atbara River, Eastern Sudan between Hudi depression and Seidon area. The animal remains were collected from five archaeological sites, EDAR11, 36, 40, 47, and 144. The samples were selected from the surface and sediment profiles, according to the size of the bones and their state of preservation.¹

METHOD AND MATERIAL

The work was based on describing the topography of the site as well as the size and fauna distribution along the surface. Metal flags were scattered along the site surface. Documentation was recorded by taking the coordinates of each point, as well as taking photos. Full descriptions of the material and sample selection were done according to the size of the bones and their state of preservation. This would facilitate the identification of the material through the anatomical feature see (Map 2).

In addition, different references were used as a key: we used Van Damme (1984) to define molluscs, and Van Neer (1993, 1995, and 2004) and Boulanger (1911) to identify fish species and Von den Driesch (1976) and Schmid (1972) to define mammals.

ARCHAEOLOGICAL SITES

Excavation site: EDAR11

This site is located about 30 km east of the Atbara River of Abu Adar Khor (Nassr 2017). The fieldwork carried out for this study was during the seasons 2016 and 2017, where the materials collected from a test excavation to a total depth of 120 cm. Animal bones were collected according to mechanical layers of 20 cm (Figs. 1, 2).

Animal remains included shells in poor preservation and remains of various wild and domestic mammals and fish. Various types of stone tools such as flakes and blades in addition to decorated pottery sherds were also recorded and date back to Neolithic period (Nasser 2017) (table 1).

Level	Bone remains	Shells
(0–20) cm	20	4
(20–40 cm)	17	14
(40–60 cm)	18	4
(60–80 cm)	15	2
(80–100 cm)	5	3
(100–120 cm)	2	2

Table 1: Amount of animal remains from EDAR011 (Albshir 2020).

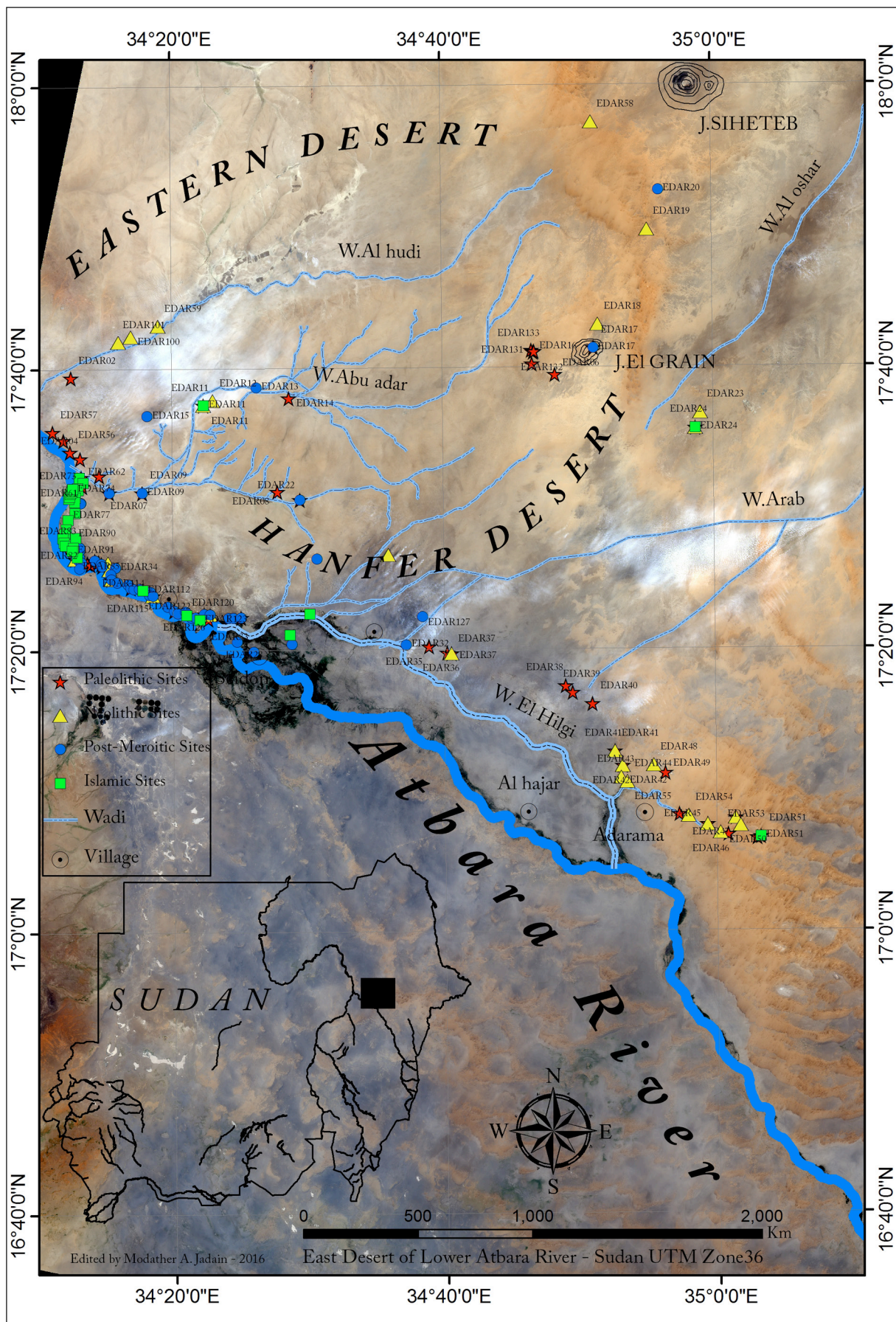
Survey sites: EDAR036, 040, 47, 144

The archaeological survey at these selected sites was conducted according to a strategy of systematic survey (see map 2). The samples of animal remains reflect their scattering along the site surface (table 2).

ANIMAL BONES STUDY

A comparative method was used to support the study of animal remains. After identifying the species of animals, they were compared to similar sites in the neighbouring (Shaqadud) and central Sudan (Kadero). The archaeological remains were included

¹ This article is a concise summary of the Master thesis done by the author and defended 2020 at the Neelain University, Sudan-Khartoum.



Map. 1: Study area in the Eastern Desert (Nassr).



Map 2: Locations of sites with animals' remains (Jadian).

in the interpretation because of their importance in identifying economic and settlement activity in the EDAR study site (see Map 1). In addition, archaeological material from the EDAR sites was compared with the archaeological material from the two model sites Shaqadud and Al Kadero. The comparison revealed late Pleistocene and early Holocene artifacts such as Neolithic ceramics and polished Neolithic axes.

MATERIAL AND PRESERVATION

The animal remains were poorly preserved. They were found in moist and black clay soils, which greatly affect it, and led to breakage, which causes lack of anatomical properties that help to define animal remains.

Therefore, the percentage of unidentified animal remains was very high (about 80% in total). The group of unidentified remains consisted of small fragments of broken bones or shells. The bones were scattered, weathered, and very dry.

Site	Area	Materials	Type of work	Bones	Shells
EDAR 11	Abu Adar	Shells, animal bones, lithic tools, pottery	(Excavation)	77 from six layers	29 from different layers
EDAR 36	W. El-Hilgi	Shells, animal bones	Survey	34	In bad condition
EDAR 40	W. El-Hilgi	shell, animal bones	Survey	17	2 incomplete shells
EDAR 144	Atbara Paleo-lake	Animal bones, shells, lithic tools, pottery	Survey	34	8
EDAR 047	Atbara Paleo-lake	Animal bones, shell, pottery	Survey	179	1

Table 2: Fieldwork in EDAR (Albshir 2020).



Fig. 1: EDAR011. The surface of the pre-excavation site layers (Photo: Nassr).



Fig. 2: EDAR011. The depth of the excavation layers (Photo: Nassr).



Fig. 3: EDAR036. The shell fragments dispersal on the surface of the site (Photo: Albshir)

IDENTIFIED MATERIAL

For all sites together, the number of identified material is 73 fragments of bones including molluscs (20, 9 %). The largest number of the defined species derives from EDAR011, where 18 fragments were identified out of a total number of 107, in addition to fragments of unidentified mollusks.

The largest percentage of the identified mammal remains derived from EDAR036, where 10 out of a total of 12 fragments could be determined (table 3, diagram).

RESULTS

The animal remains collected from the five archaeological sites were studied and classified in tables. The tables include detailed information about each bone specimen such as family, species, any part of the animal structure (tables 4, 5, 6, 7, 8, 9).

EDAR11: The animal remains included mammals such as dog (*Canis familiaris*), pig (*Sus domesticus*), gazelle (*Gazella dorcas*), sheep (*Ovis aries*), goat (*Capra hircus*) as well as unidentified shells and fish remains (table 4).

The remains of mammals were concentrated in layer 3 if compared with the rest of the layers and the site also contained a diversity in the animal species if compared to the other sites (EDAR036, EDAR040, EDAR047, and EDAR144). While fish remains were concentrated in the third and sixth levels and the total of fish remains was about 8fr, 7fr were identified, while 1fr was unidentified. About 85 fragments of mollusks came out from the



Site	The identified animal remains/ Percentage		Unidentified remains/ Percentage		Total of the material
EDAR011	18	16,8%	89	83,1%	107
EDAR036	10	83,3%	2	16,6%	12
EDAR040	14	60,8%	9	39,1%	23
EDAR047	16	8,7%	166	91,2%	182
EDAR144	15	60%	10	40%	25
	73	20,9%	276	79,1%	349 100%

Table 3: Showing the numbers and percentages of identified and unidentified remains from the study sites.

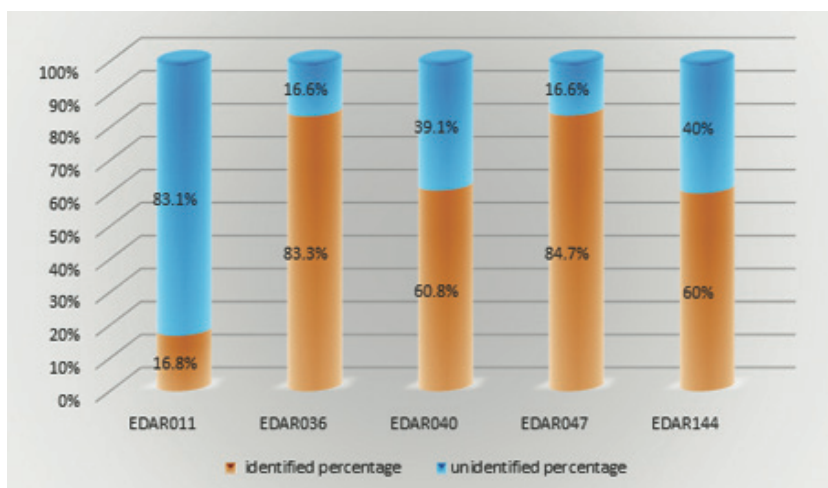


Diagram: Statistical Form (1) showing the percentages of identified and unidentified animal remains (Al Bshir, 2020).

Skeletal element	Mandible	Metacarpal metatarsals	Horn	Tooth	Phalanx 2	Cervical vertebrae	Total	Levels
Animal family / species								
Goat (<i>Capra hircus</i>)	1						1	Level 3
Gazelle (<i>Gazella dorcas</i>)			1				1	Level 3
Sheep (<i>Ovis aries</i>)				1			1	Level 3
Pig (<i>Sus domesticus</i>)					1		1	Level 6
Dog (<i>Canis familiaris</i>)						4	4	Level 3
Ruminant		1	1				2	Level 3
Small ruminant	1						1	Level 3
Identified material	2	1	2	1	1	4	11	Level 3,6
Unidentified	3						3	Level 1,2
Total							14	

Identified: 11

Unidentified: 3

Total: 14

Mollusks:

Unidentified: 85

Family /species	Level 3	Level 6
Fish:		
<i>Bagrus</i> sp.*	1	
<i>Heterotis niloticus</i> **	5	
<i>Clarias</i> sp.***		1
Unidentified	1	
Total: 8	7	1

* pectoral spine, ** (4) neuro cranium, (1) scapula, *** vertebrate

Table 4: Showing of identified and unidentified remains from excavation site EDAR011.



Fig. 4: EDAR 040. Osteoderm of crocodile (Photo: Albshir).



Fig. 5: EDAR040. Large mammal remains on the surface of site (Photo: Albshir).

six levels that have not been identified because of the state of the preservation (table 4, 9).

EDAR036: about 34 animal remains were collected from the site. They contained mammals such as cattle (*Bos taurus*), pig (*Sus domesticus*) equid (*Equus sp.*) as well as molluscs see (fig. 3) and (tables 5, 9).

EDAR040: The animal bones were visible on the surface of the site (fig. 4). Only 17 animal bones and 2 incomplete shells were collected. The bones are considered to be bovids such as antelope or buffalo, equid, cattle (*Bos taurus*) (table 6) and reptiles such as crocodile (*Crocodylus sp.*) (fig. 5) and molluscs (fig. 6 and table 9).

Skeleton elements	Tooth	talus	Carpal	Metacarpals	Pelvis	Notice
Species						
Mammals:						
Sheep (<i>Ovis aries</i>)	1					M2+Adult
Cattle (<i>Bos taurus</i>)		3fr				
Pig (<i>Sus domesticus</i>)			1	2fr		
Equid (<i>Equus sp.</i>)	3f				1adult	Tooth M1+M1
Total: 11	4	3	1	2	1	

Table 5: Identification of animal bones from EDAR036.

Skeleton elements	Tooth	Talus	Metatarsals	Metacarpals	Notice
Species					
Mammals:					
Cattle (<i>Bos taurus</i>)	1	1	1		M lower jaw + adult
Pig (<i>Sus domesticus</i>)	1			1	Adult
Bovidae (antelope or buffalo?)	3				
Equidae	1				M3 lower jaw + mule
Equidae	2				+ P4 lower
identified remain: 11	8	1	1	1	
Unidentified remain: 17					
Total: 28					
Reptiles:	Osteoden				Notice
Crocodile (<i>Crocodylus sp.</i>)	1				Scute of crocodile
Total: 1					

Table 6: Identification of animal bones from EDAR040.



EDAR144: The animal remains appeared on the site's surface. About 34 animal remains and 8 shells have been collected from the surface and included mammals such as sheep (*Ovis aries*), donkey (*Equus asinus*), pig (*Sus domesticus*) and molluscs (tables 7, 9).

EDAR047: The site was cleared and the concentrated bones were collected in one place by making a square

of 2×2m. The surface of the remnant collection was distinguished by high accumulation and a grey color of the soil, which differentiates the surface from others in the area (fig. 7). The site is characterized by its highness and its richness of sediments. There are 12 layers of sediments with a total height of 8–12 meters. Moreover, it contains animal remains and other archaeological material inside (fig. 8a, 8b).

Skeleton elements Species	Tooth	Ulna with Radius	Horn	Metacarpals	Calcaneus	Talus	Notice
Mammals: Sheep (<i>Ovis aries</i>) Pig (<i>Sus domesticus</i>) Big ruminant Donkey (<i>Equus asinus</i>)	1	3	1	2fr	1	1	Broken
Unidentified: 9 Identified remain: 9 Total: 18	1	3	1	2	1	1	

Table 7: Identification of animal bones from EDAR144.

Skeleton elements Species	Ulna with Radius	Humerus	Metacarpals	Calcaneus	Metatarsals	Notice
Mammals: Pig (<i>Sus scrofa</i>) Cattle (<i>Bos taurus</i>)	7	1	1	1	2	Adult Adult
Identified: 12 Unidentified: 166 Total: 178	7	1	1	1	2	
Bird: White stork (<i>Ciconia?</i>)	Tarso- metatarsus 1					Notice Broken
Total: 1						

Table 8: Identification of animal bones from EDAR047.

Family /species	EDAR036	EDAR040	EDAR047	EDAR144
Mollusks: <i>Pila werner</i> * <i>Lanistes carinatus</i> * <i>Chambardia rubens</i> *** <i>Bulimulus nubilus</i> ** <i>Etheria elliptic</i> *** <i>Unio tereticulus</i> *** Unidentified	9 3	1 1 1	1 2 2 1	5 1 1
Identified: 28 Unidentified: 1 Total: 29	12	4	6	7

*Freshwater (gastropod), *** large Bivalve

Table 9: Identified remains of molluscs from archaeological survey sites.



Fig. 6: Showing the animal remains collected at the site EDAR047 (Photo: Albshir).



Fig. 7: EDAR 047. *Pila wernei* shell in a good state of preservation (Photo: Albshir).

Additionally, 179 animal remains and 1 shell have been collected: mammals such as cattle (*Bos taurus*), pig (*Sus scrofa*) and the white stork as well as molluscs (fig. 9, 10 and tables 8, 9).

Comparison of the fauna with the archaeological sites Shaqadud and Kadero:

By presenting the animal remains from Shaqadud and comparing it with fauna from the Eastern Desert of the lower Atbara River, *Pila wernei* was found at the Shaqadud, it also contained *Etheria elliptic*, *Lanistes carinatus* and other types of mollusks. However, Cleopatra bulimoides and other mollusks were not found in the eastern desert of the lower Atbara River.

Mammals, antelope, goats, sheep, cattle and donkey were found at Shaqadud site and EDAR, but giraffes and small and medium carnivores which

were not recorded in EDAR sites.

Various types of fish were also found in the Eastern Desert of the lower Atbara River, such as *Bagrud* sp., *Clarias* sp., and *Heterotis niloticus*. This was not found in the Shaqadud area. This may be due to the difference in the economic patterns between the two areas, or the nature of Buatana sites which are far from the Nile and its tributaries. However, the presence of types of molluscs indicate the presence of water in the area. In the Eastern Desert of the lower Atbara River, only

one type of bird (white stork, *Ciconia ciconia*) was found, while different types of birds were found in the Shaqadud area.

As for reptiles, they varied at Shaqadud, as turtles, lizards and other types of reptiles were present (Marks & Mohammed-Ali 1991: 192–193). At the sites in the Eastern Desert of the lower Atbara River only a scute (osteoderm) of crocodile was found.

By comparing the animal remains of Eastern Desert of the lower Atbara River with the remains of Shaqadud sites, we figured out that the animal remains moved from wetter environments about 500–450 mm to a dry savanna about 350 mm during the period between 7400–3600 BC (Marks & Mohammed-Ali 1991: 192–193). The process of domestication was dated in Shaqadud later than at the sites of Central Sudan (Zakiab, Nofalab) and other Neolithic sites, it is clear that the environment in the Eastern Desert of the lower Atbara River experienced environmental conditions similar to the sites of Shaqadud. The rain and humidity rates may have reached about 500 mm, due to the presence of a clear similarity by comparing the animal remains.

Al-Kadero site was different to other Neolithic sites in the region by the presence of human cemeteries, in addition to the human group of shepherds. This group executed a food production process which was more developed than the traditional economic patterns (Krzyzaniak 1977: 266).

Some animal remains at Kadero were found in the sites of the Eastern Desert of the lower Atbara River too, like molluscs as *Pila*. The mammals varied in al-Kadero site, however there is a similarity between the two sites in some species such as dog, cattle and sheep. Catfish existed as well while the remains of bird was rarely found in both sites.



Fig. 8a: EDAR047. The accumulation of the sediments at the site with animal remains visible at the profile (Photo: Albshir).



Fig. 8b: EDAR047. The accumulation of the sediments at the site with animal remains visible at the profile (Photo: Albshir).

The area needs more study to the diversity of the animals and environmental change. Comparing the animal remains of the sites of the Eastern Desert of the lower Atbara River needs further expansion and deepening. In general the animal remains that were

found in the area are similar to the remains that were discovered in most of the Neolithic sites in central Sudan, Khar-toum (Arkell 1949) and Kadero (Sobocinski 1977; Krzyzaniak 1978) and Shaheinab (Arkell 1953).

DISCUSSION

Analyzing and identifying the material collected from the study sites revealed that animal remains belong to different species of animals and classes:

Mammals such as goat (*Capra hircus*), gazelle (*Gazella dorcas*), sheep (*Ovis aries*), pig (*Sus domesticus*), and dog (*Canis familiaris*). Small ruminants remained unidentified because the anatomical features were not clear to identify the species. In addition, a reptile (crocodile) was seen in the EDAR40, birds (white stork) are present only in EDAR47.

This diversity helped considerably in the process of reconstructing the palaeoenvironment in the study area (Albshir 2020; see also Marks & Mohammed Ali 1991: 2; Arkell 1949; 1953; Krzyzaniak 1977; 1978; Sobocinski 1977; Tigani Elmahi 1982; Madibo 2019). Remains of fish were represented only at the site EDAR011 (Fig. 1.2) at the third and sixth layers (table 4). The remains of the molluscs were found in all studied assemblages. In the site EDAR11 they were in poor state of preservation, which made the identification more difficult. Molluscs included different kinds of shells such as bivalve and gastropods were defined (table 9).



Fig. 9: EDAR040. *Unio terticulus* shell in a good state of preservation (Photo: Albshir).



Fig. 10: EDAR047. *Etheria elliptica* shell (Photo: Albshir).



The species of mammals mentioned earlier in the study need herbal plant cover as well plenty of water, which in turn saving suitable conditions for providing food. The diversity of animal remains show a mixture between domestic and wild animals and this reflects a stratified sequence for the human (?) groups in the study area where domestic remains appear in upper layers. The archaeological material such as lithic tools and pottery from the same levels confirm the relationship with the near neighborhood stronger than with the sites from Central Sudan (Albshir 2020, Marks & Mohammed Ali 1991). This is shown by comparing the archaeological material from both regions. Nevertheless, the similarities in the animal remains reflect that both areas are in the same geographical zone. It seems that the human migrated from the sites of Shaqadud to Eastern Desert of the Atbara region to live close to the Paleo-lake of Atbara during the Late Pleistocene when the environment became drier (Nassr 2017; Albshir 2020). Moreover, the remains of fish, crocodiles and molluscs at site EDAR11 (table 4) confirm the presence of permanent water bodies in vicinities of the archaeological sites. The wet environment was overwhelming during the late Pleistocene and early Holocene periods. It is evident that the region witnessed floods because of the high water levels in Atbara River or the Atbara Paleo lake (Marks & Mohammed Ali 1991, Halaand 1981).

CONCLUSIONS

Based on the animal remains identified from the five sites in EDAR area, the reconstruction of the environment there is possible and hints to regular rainfall and wet conditions during the late Pleistocene and early Holocene period in the region. In turn, this provided environmental conditions that allowed the existence of vegetation and the creation of tributaries of water which was attractive to humans and animals. Atbara River Lake during the Holocene played the greatest role in the presence of settlements of the Neolithic period on the margins at the lake. Several sediment profiles and mounds contained large extensions of Middle Paleolithic and Neolithic materials. This indicates a fertile region and rich environment in EDAR area during late prehistoric times (Nassr 2017; Albshir 2020).

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ZUSAMMENFASSUNG

EDAR ist ein archäologisches Projekt, das von der Universität Al Neelain, NCAM und der Universität Breslau in der östlichen Wüste am unteren Atbara-Fluss durchgeführt wird (Nassr und Masojc 2018). Insgesamt wurden 155 archäologische Stätten dokumentiert. Die allgemeine Chronologie und die Siedlungsmuster der Stätten wurden bereits veröffentlicht (siehe Nassr 2017, Masojc et al 2019). Die Autorin konnte das Projekt im Zuge ihrer Masterarbeit für zwei Kampagnen begleiten, um die tierischen Überreste zu untersuchen. In diesem Beitrag wird eine Zusammenfassung der Ergebnisse vorgestellt. Es werden verschiedene Tierarten identifiziert, darunter Säugetiere wie Rinder, Ziegen, Schafe, Schweine, Hunde, Büffel bzw. Antilopen, Esel, Pferde, Schweine, große und kleine Wiederkäuer sowie Vögel und Krokodile, Fische und Weichtiere. Es wurden fünf archäologische Stätten ausgewählt, wobei die EDAR11 durch Ausgrabungen untersucht wurde, während EDAR36, EDAR40, EDAR47 und EDAR144 durch Boden- und systematische Erhebungen beprobt wurden.

Die Proben standen in Verbindung mit archäologischen Kulturschichten und Kontexten des Mittelpaläolithikums und Neolithikums und offenbarten eine reiche Umwelt des späten Pleistozäns und frühen Holozäns im EDAR-Gebiet. Vergleichsstudien mit spätprähistorischen Sites im Zentralsudan (Region Khartum und Butana) zeigten große Ähnlichkeiten des Gebiets mit der spätprähistorischen Archäologie der mittleren Nilregion.