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Unknown *HAFIR* at Jebel Shaqadud: new evidence on water management in central Sudan

Introduction

In March 2018, the authors visited Jebel Shaqadud (ca. 116 km northeast of Khartoum) in the Butana Desert (the area between the Nile and Atbara rivers in central Sudan) regarded as the hinterland of the Late Kushite Empire (ca. 300 BC – AD 350; fig. 1). In the course of reconnaissance of late prehistoric sites in the broader vicinity of the Shaqadud box canyon, explored in the 1980s in the framework of the Southern Methodist University – University of Khartoum Butana Archaeological Project (Elamin 1992; Elamin and Khabir 1987), a number of sites of historical dating, apparently neglected by previous fieldwork, were noted. The remains of a *hafir* (16°15'29.92" N, 33°23'15.00" E) located 2.6 km to the north of the Shaqadud cave and 12.9 km to the east of Naqa, one of the most important power and ritual centres of the Meroitic kingdom, clearly stands out among them as the most significant one. Interestingly, despite this close distance from Naqa, it has not been mentioned in the archaeological literature as yet (cf. Hinkel 2015).

Description of the *HAFIR* and other finds

The remains of the *hafir* built on a slightly oval ground-plan 67 × 55 m in size (measured between the highest points of the rampart) are distinguished

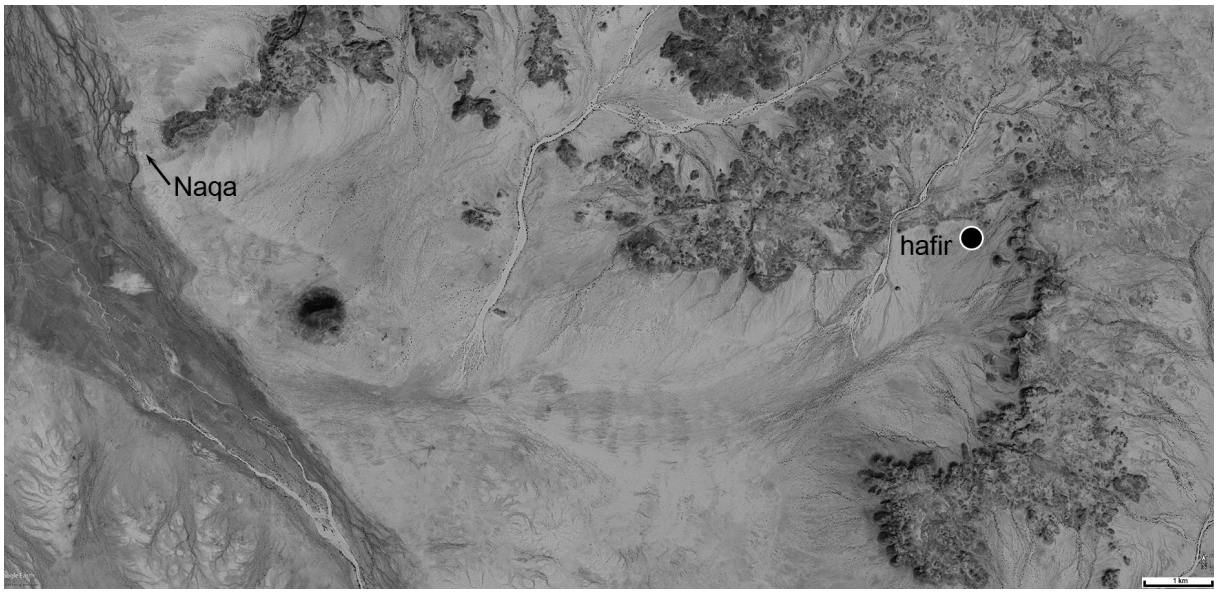

Fig. 1: Location of the *hafir* in the area of Jebel Shaqadud in the western part of the Butana Desert (background: Google Earth 4/2018).

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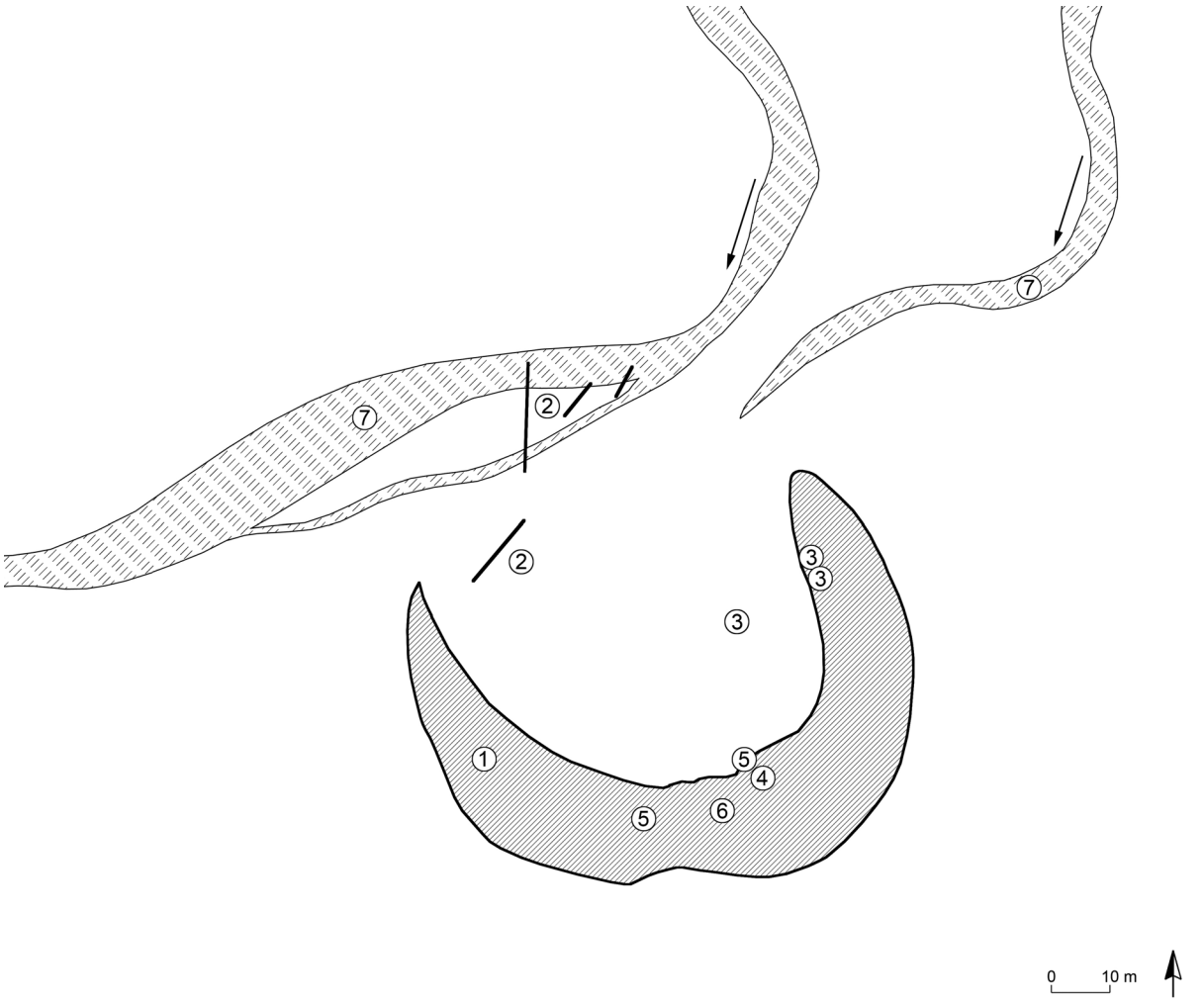

Fig. 2: Plan of the *hafir* at Jebel Shaqadud. 1 – gravel-sand rampart with accumulation of stones near the interior perimeter; 2 – water-guiding stone lines; 3 – graves; 4 – possible stone hearth; 5 – mancala-type game boards; 6 – find spot of the fragment of a handmade cup; 7 – *wadi* (drawing by L. Varadzin).

by several markers (fig. 2). Conspicuous is its lateral position with respect to the course of a *wadi* (fig. 2: 7), that is to say not directly in the course of a watercourse, as some of the *hafirs* are built locally at present times. Its comparatively massive circumferential rampart of local gravel-sands, today extensively eroded, attains a height of ca. one metre (fig. 3). The original parameters of the rampart cannot be established without archaeological excavation, nevertheless, its former considerable height and the volume of excavated material are indicated by the width of the eroded mass which equates to more than 20 metres (fig. 2: 1). The interior perimeter of the rampart is fringed by loosely distributed large pieces of local sandstone showing advanced patination and no signs of stacking or working. Therefore, it is not clear whether they constitute the remains of a facing wall, or just a simple coating. As the stones occur mainly near the interior perimeter of the rampart, their role appears to have been to protect the rampart from erosion by the inflow of water. On the northern side, where the *hafir* adjoins the *wadi*, the rampart is discontinued.

Nowadays, the interior of the *hafir* is filled with laminated fine sandy-clay sediment. With some exceptions, the surface of the terrain at these places lacks stones and gravel that occur commonly in great quantities in the closest vicinity. Several trees and shrubs are growing in the centre of this area, attesting to an increased concentration of subsurface water (fig. 3). It is here where we suppose one would find the remains of a dug reservoir; the exact dimensions and depth of the reservoir cannot be established without excavation. Let us add that investigations of other *hafirs* have shown the effective water storage areas to be usually smaller than the area delimited by the rampart (Näser and Scheibner 2013; Wolf 2015).

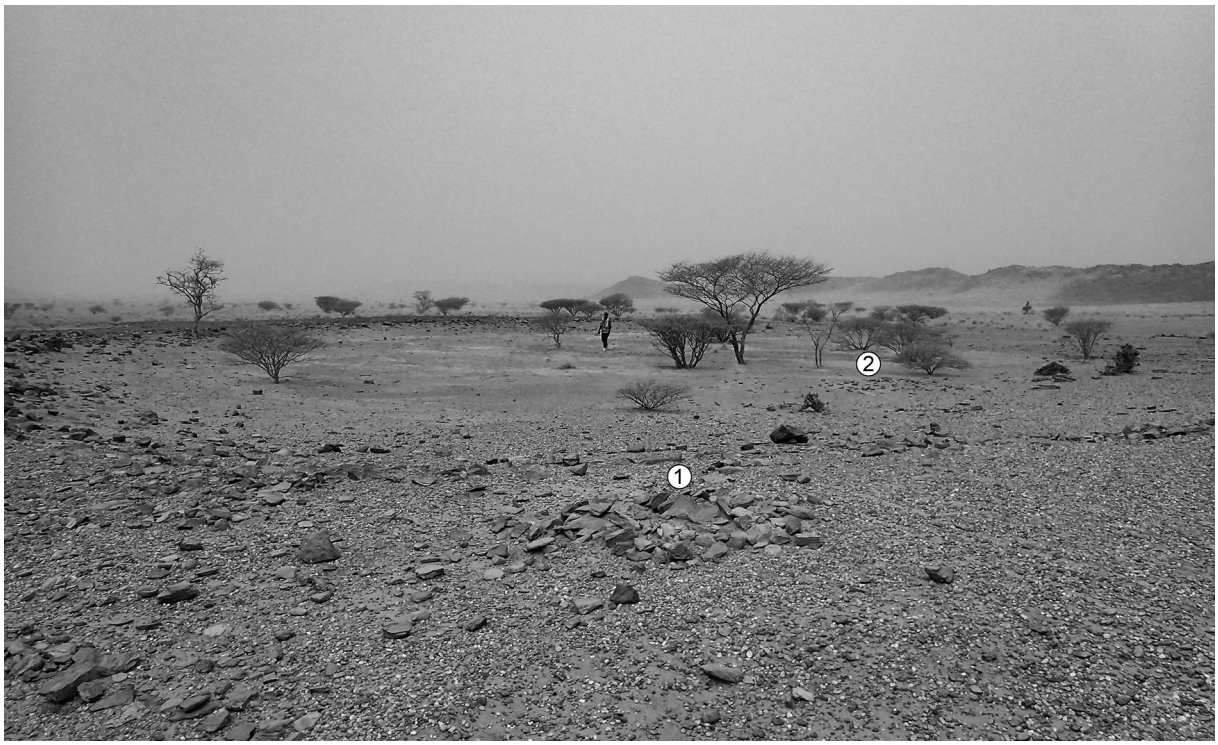

Fig. 3: General view of the *hafir* from the south-east: 1 – probable grave on the rampart; 2 – probable grave in the interior of the *hafir* (photo by D. Q. Fuller).

Another component is represented by simple stone alignments that run across the *wadi* and are oriented towards the interior of the *hafir* (fig. 2: 2; 4: 1). Without excavation one can observe their height to be of only one course of stones. The purpose of these comparatively subtle walls was apparently to direct only limited quantities of water from the *wadi* to the inside of the *hafir*, perhaps to prevent the violent current of water from damaging the rampart.

In the area of the *hafir* we noted also other structures that we can associate with the function of the *hafir* only indirectly or not at all. The crown of the rampart on the north-eastern side features two accumulations of stones measuring 1.9 × 1.4 m (the southern one) and 1.7 × 1.3 m (the northern one) in diameter (figs. 2: 3; 3: 1; 4: 2, 3). Another oval-shaped structure of sparsely spaced stones of small to medium size rests directly on the surface of the sediments inside the *hafir* (fig. 2: 3; 3: 2). The function of these three structures cannot be determined unequivocally without excavation; nevertheless, they most likely constitute graves. We do not exclude that there are further graves situated on the rampart, concealed beneath not quite clear accumulations of reused pieces of sandstone. Other secondary structures include a rather small stone hearth (figs. 2: 4; 4: 4) and, in its vicinity, two sandstone blocks with 25 and 36 pecked depressions arranged to form mancala-type game boards (cf. de Voogt 2010) (figs. 2: 5; 4: 5). Another possible game board with 10 cupules arranged in two rows was recorded on a sandstone block emerging from the rampart some 20 m to the west (figs. 2: 5; 4: 6).

Despite intensive search, the immediate vicinity of the *hafir* was virtually devoid of any pottery or other datable finds. The only exception is a piece of a cup found between stones on the top of the rampart on the southern side of the *hafir* (figs. 2: 6; 5). The cup is a globular vessel with a rim diameter of 10 cm. The rim is slight inverted and the base is flat and narrow (~2 cm). It is handmade, in a yellow-brown clay, incompletely oxidized with a red slip. Parallels for this vessel, and its form include a handmade bowl from Meroe West cemetery in a tumulus excavated by Garstang, that is probably early Post-Meroitic in date (Dunham 1963: 334, Fig. 188c, #504); similar finds came from upper deposits of Garstang's Meroe excavations (Garstang 1911: 40, Type 29; Pls. XLII: 6, XLV: 29; cf. Török 1997: 39). It is also paralleled by forms (12R, 28R, 30R) from the lowermost levels at Soba (Welsby 1991: 206, 208, Fig. 117; 1998: 112–113, 173, Tabs. 24, 25), and by finds from the cemetery at Gabati, including from a Late Meroitic grave (<3807>), and a somewhat taller form in a Post-Meroitic burial (<5807>) (Edwards 1998: Figs. 6.12, 6.28). Taken together these parallels suggest a date around the end of the Meroitic period or early Post-Meroitic period.

An association between the handmade cup, which can be dated based on the above analogies to Late Meroitic or Post-Meroitic period (AD 200–550), and the function of the *hafir* is not apparent. It can be a discarded find from the time of or after functioning of the *hafir*, but also a residue of an unspecified burial or a burial ritual from a period post-dating the end of functioning of the *hafir*.

Discussion and conclusion

The advanced destruction of the perimeter rampart, patination of the sandstone pieces, and probable presence of secondary graves from the period when the water reservoir no longer fulfilled its function all speak in favour of a considerable age of the *hafir*. The only associated datable find is represented by a torso of a cup attributable generally to the early Post-Meroitic period or very late Meroitic period. With respect to the considered depositional circumstances, this cup provides a terminus ad or ante quem for the dating of the operation of the *hafir*.

The *hafir* of Shaqadud can be grouped among analogous structures known from the Meroitic centres at Meroe, Musawwarat es Sufra, Basa or Umm Usuda (Hinkel 1991). With its constructional elements (circumferential rampart with stones on the

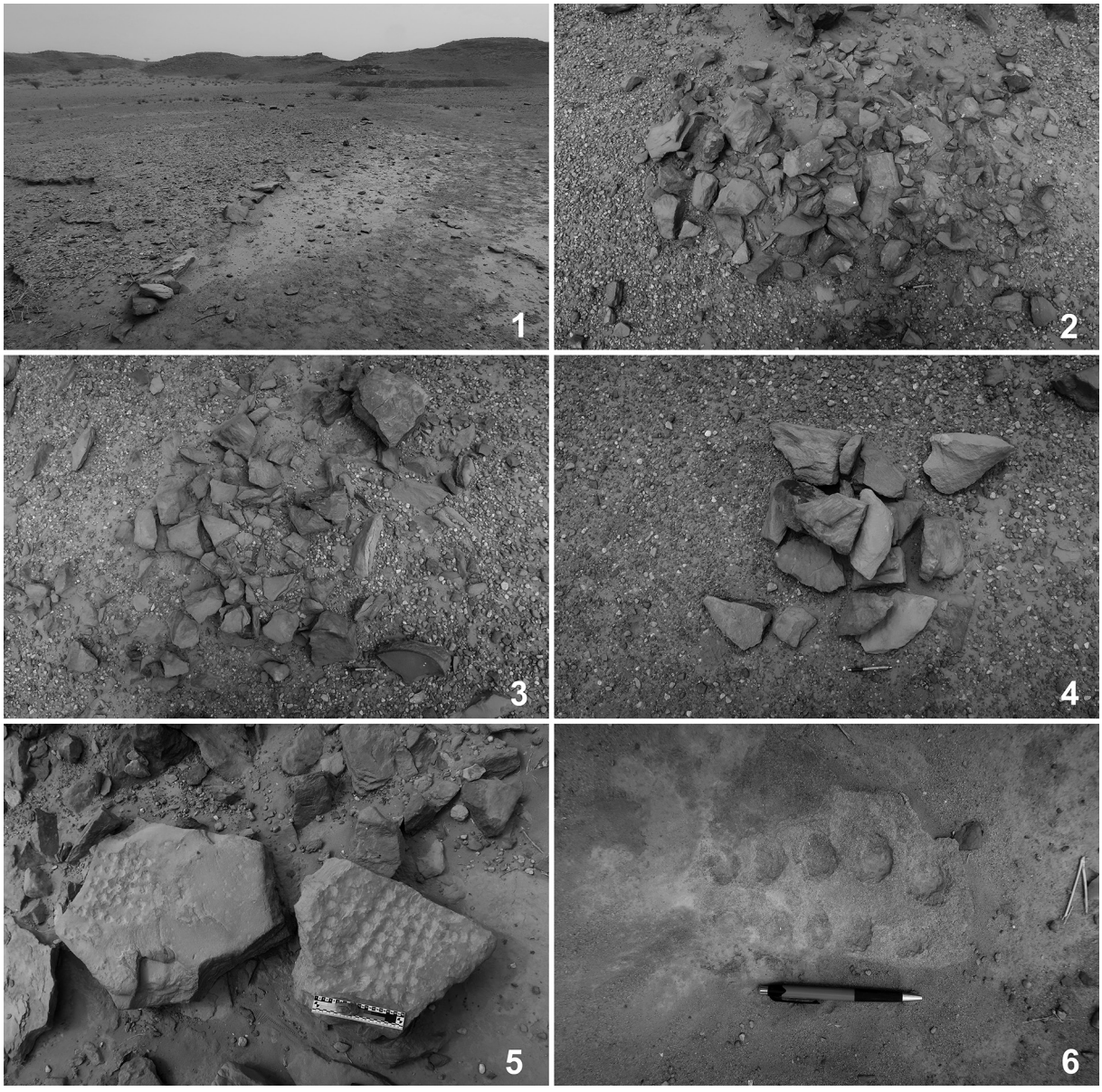

Fig. 4: 1 – One of the water-guiding stone lines, view from the south-west; 2, 3 – Probable graves found on the eroded rampart; 4 – remains of a possible stone hearth; 5 – two mancala-type game boards on loose pieces of sandstone found on the rampart on the south-eastern side of the *hafir*; 6 – mancala-type game board on a piece of sandstone emerging from the rampart on the western side of the *hafir* (photo by L. Varadzin: 1–5; L. Varadzinová: 6).

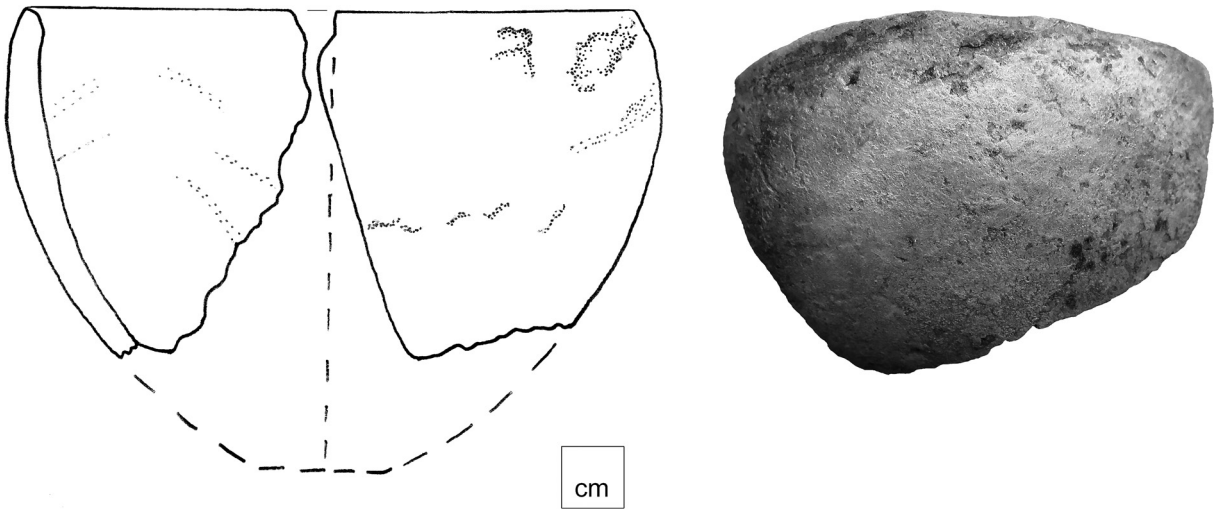

Fig. 5: Fragment of a handmade cup found in the area of the *hafir* (photo and drawing by D. Q. Fuller).

interior perimeter, stone alignments regulating the inflow of water from the *wadi*) and lateral position with respect to the *wadi*, it is reminiscent in particular of the Great *Hafir* at Musawwarat es Sufra (Näser 2008; Näser and Scheibner 2013). Those engaged in its construction must, therefore, have been well acquainted with this advanced technology of water supply and retention. However, it differs from the above-mentioned parallels by comparatively small dimensions and by absence of a sacral structure in a close (as well as broader) vicinity. Nearly virtual absence of discarded pottery in its broader area, in our opinion, precludes its association with any central functions presupposed with *hafirs* constructed under state control (Edwards 2004; Weschenfelder 2012). Therefore, a question arises whether this structure was constructed without engagement of the state power, i.e., by local agro-pastoral communities. The comparatively small capacity of the reservoir suggests only a seasonal function, complying well with the cyclical character of local grassland subsistence strategies.

Since the hitherto archaeological research has devoted attention in particular to the gigantic *hafirs* located at the central Meroitic sites, it may appear that their existence was connected in antiquity only with complex political systems. In the case of the substantially smaller structure at Shaqadud that lacks any expressions of central function, however, there is no way to demonstrate a connection of this kind. This leads us to an important question concerning the still unexplained historical origin of this technical innovation, specifically (a) whether the Meroitic kingdom's *hafirs* were copied by local groups and built without any engagement of the central power whatsoever, or (b) whether it is not better to search for the origin of *hafirs* in general rather among the agro-pastoral communities inhabiting dry savannah (Näser and Scheibner 2013: 392), in other words, whether the archaeologically well-known *hafirs* are not just enlarged variants adopted and adapted for the specific needs of the state power. Answers to these questions would definitely emerge from an in-depth exploration and from archaeological excavation of *hafirs* in the heart of the Butana Desert. However, such exploration is still rather in its infancy.

Acknowledgements

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Zusammenfassung

In diesem Beitrag berichten wir über die Überreste eines Hafirs (künstliches Wasserreservoir), das im westlichen Teil der Butana-Wüste in der Nähe der antiken Stätte Naqa gefunden wurde und spätestens vor oder in die post-meroitische Zeit datiert werden kann (ca. 200-550 n. Chr.). Obwohl seine Bauelemente den bekannten gigantischen Hafiren an den zentralen meroitischen Stätten ähneln, erlauben seine geringen Abmessungen und das Fehlen von Indikatoren einer zentralisierenden Funktion, die Errichtung durch lokale Agro-Pastoralisten anzunehmen, die sich der direkten Kontrolle der meroitischen Zentralmacht entziehen. Dieser neue Fund erfordert eine eingehende Erforschung der Herkunft und Ausbreitung dieser alten Form der Wasserwirtschaft, die im heutigen Sudan noch immer im Einsatz ist.