SODMEIN CAVE

Third Field Report – Season 2012

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Report on the third field season of the joint research project "Sodmein Cave" (Eastern Desert, Egypt) in spring 2012

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1 Introduction

The third field season of the joint research project "Sodmein Cave", conducted by the German University of Cologne and the Belgian University of Leuven, took place in spring 2012 between the 10th of March and the 15th of April. The field work was carried out under the aegis of the Collaborative Research Centre 806, which was established in 2009 by the Deutsche Forschungsgemeinschaft (Research Funding Organisation).

During the Late Quaternary the anatomically modern humans (AMH) dispersed across and out of Africa to eventually populate all inhabitable continents. Knowledge of palaeoenvironments and human behavioural patterns in Africa prior, during and after these dispersals is crucial for understanding how and why hunter-gatherers were able to adapt rapidly to the new environments they encountered. However, very few well-dated archaeological sites from this time period are known from Northeast Africa. Egypt is an important area en route to the Levant (cf. Wurz & van Peer 2012). As it is bound by the bottleneck of the Sinai Peninsula connecting Africa and Asia, Egypt provides an exciting background.

During the first field campaign in 2010 the archaeological excavations in Sodmein Cave could be resumed as a kind of continuation of the 1990's activities of the Belgian Middle Egypt Prehistoric Project (BMEPP). On the contrary, the focus during the second season was on the analysis of the archaeological material from the former Belgian excavations in the magazine of Quft. The aim of this 2012 spring campaign concentrated anew on the archaeological excavations in the cave. The main objectives of this last research season have been to

- continue the archaeological excavation in the cave,
- document the trenches and the cave with a 3D laser scan and,
- survey the terrace in the nearer surrounding of Sodmein Cave.

2 Sodmein Cave

Sodmein Cave – located about 40 km north-northwest of the seaport Quseir in an isolated Tertiary limestone complex (Djebel Umm Hammad/Djebel Duwi) of the Egyptian Red Sea Mountains **(fig. 1)** – is one of the rare living sites from the Late Pleistocene in Northeast Africa. Its outstanding cave stratigraphy is spanning with more than 4 m stratified

human occupation debris from the Middle Palaeolithic (or Middle Stone Age) up to the Neolithic, with a stratigraphic hiatus between around 25,000 to 7,500 years ago. The general stratigraphy is well-established by the research of the BMEEP in the 1990's, during which they excavated different trenches in altogether four sectors labelled A to D (cf. Moeyersons et al. 2002, Vermeersch 1994, Vermeersch et al. 1996, Van Peer et al. 1996).

Figure 1. Location of the research area Sodmein Cave in the Egyptian Eastern Desert (square). The detail map illustrates Djebel Duwi and the sites Saqia Cave, Tree Shelter and Sodmein Cave mentioned in the text.

2.1 Archaeological excavation

The emphasis during this 2012 field season was placed on the archaeological excavation in Sodmein Cave, where a BMEPP trench in sector B was enlarged in the squares 40N/0-2W and 41N/0-2W. In this part of the cave the profiles exhibited a succession of backfill and other deposits that are very old; two Emireh points were found in the past by

the BMEPP in this area. Already in 2011 an extension of 3 m² was established north of the former Belgian trench but due to some administrative problems – with regard to the military permit – only the Holocene layers could be reached at that time. During the 2012 season the excavation could be enlarged to 6 m² **(fig. 2, above left)** as well as the lowermost level J, associated with the Early Nubian Complex, could be reached and excavated. After a few meters the rockfall deposits – resting directly on the bedrock – were reached **(fig. 2, right)**. Hopefully, the archaeological activities in this part of the cave will not only provide further information on the position of Sodmein Cave in relation to archaeological sites from the same time period in the Nile Valley but also will afford new insights into its relation with other sites from the Middle East.

Figure 2. Extending the former BMEPP trench in sector B by a 6 m² excavation in 40N/0-2W and 41N/0-2W (above left); excavation in progress (below left); base of the 2012 excavation in 40N/0-2W and 41N/0-2W; clearly visible is the rockfall deposit at the bottom of the trench (right).

Equivalent to the former excavations in the adjacent trench B, the ten different stratigraphic layers and two disconformities – specified afore by the BMEPP team (cf. Moeyersons et al. 2002) – could also be distinguished in this newly excavated area. Initially, the three Holocene layers, labelled as A, B and C, were removed on top of the subsequent Pleistocene layers D to J with its two disconformities (one between the layers F/G and the

lower disconformity). It was possible to locate several unstructured hearths in the entire stratigraphic succession of Sodmein Cave. Characteristic for the complete stratigraphic sequence is the occurrence of numerous plant remains and animal bones in a very good state of preservation, which allow the reconstruction of environmental changes in the Eastern Desert over the last hundred thousand years. Each stone artefact and each archaeological feature was measured individually by a total station. Sketches were drawn from the features, profiles and layers. After the excavation the new trenches were documented by sketches, photos and 3D-scans.

In some parts of the cave, especially near the drip line, the sediments were extremely hard and consolidated by the influence of water and weathering processes. It was highly time-consuming to excavate these parts because of its solid and compact residues. Partly stone artefacts were incorporated into these consolidations, wherefore its removal with hammer and chisel had to be done as careful as possible. Such artefacts had to be placed afterwards for some time into vinegar, to remove rests of the remaining consolidation material.

All kinds of this operose post-processing work – as for example cleaning and labelling artefacts, archiving and documenting finds, photographing or drawing stone tools – was done after the excavation in the house **(fig. 3)**.

Figure 3. Cleaning the screening from chips, little bones and charcoal (below) and photo documentation of an artefact from layer F2 in Sodmein Cave (above).

2.2 Documentation with a 3D laser scan

To support the geo-archaeological work in Sodmein Cave and the nearer surrounding, it was made use of a 3D laser scanner. Terrestrial Laser Scanning (TLS) is a ground-based active imaging technique and its dense 3D point clouds are used for different applications. In Sodmein it was applied to obtain volumes and shapes of the geomorphologic cave structure but also to document the newly excavated profiles as well as the interior of the cave, which is very costly in terms of time if it would be done by standard methods. Three scan positions outside the cave (geo-referenced by a total station) and six inside were used to achieve a full model. Values of dislocation are estimable and seem to indicate that Sodmein Cave is mainly of tectonic origin **(fig. 4, above)**. Generally, maps and 3D models help to understand and to visualize the structure and the characteristic features of complex archaeological sites.

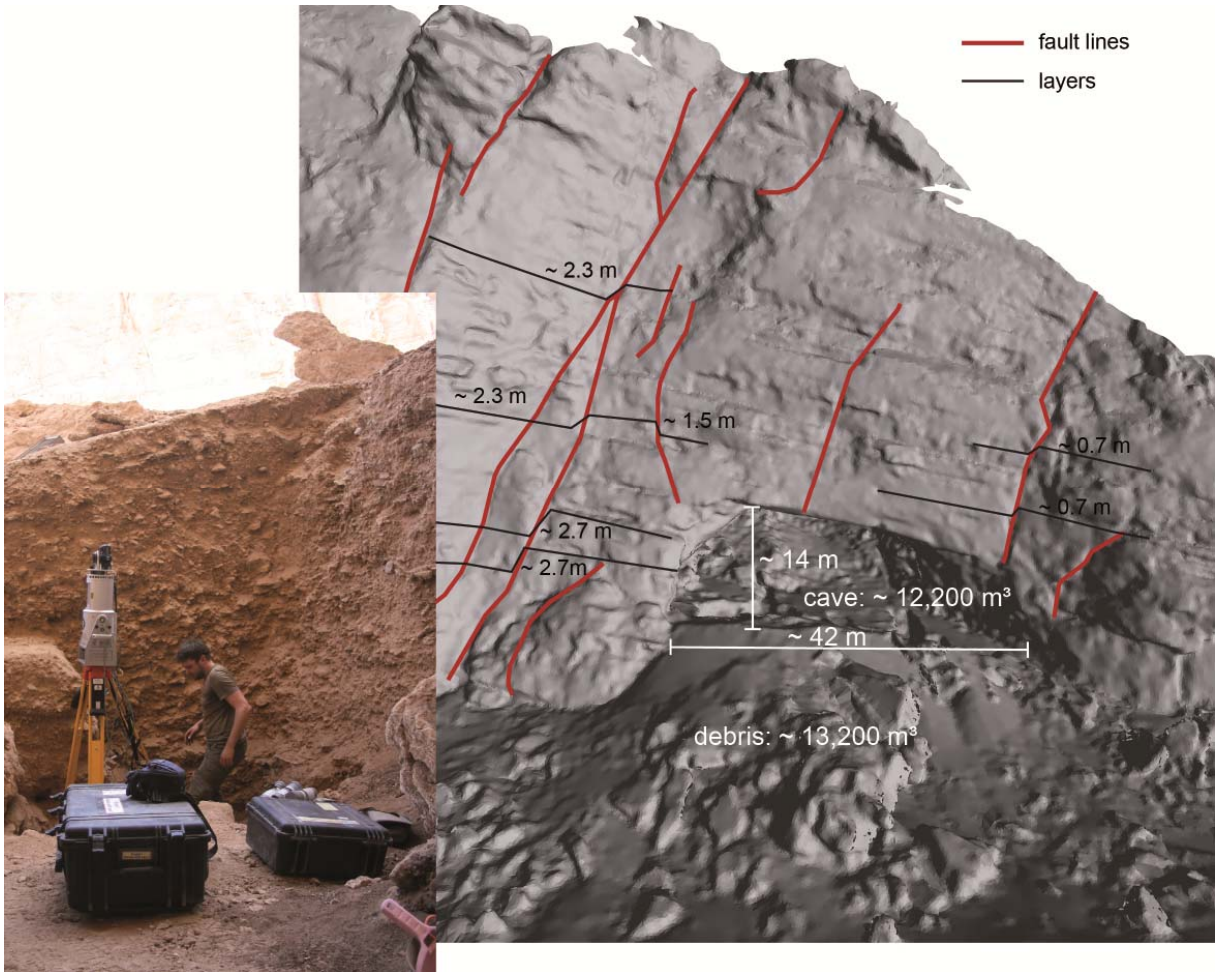

Figure 4. Terrestrial Laser Scanning (TLS) model of Sodmein Cave with the different fault lines and layers in the limestone of Djebel Duwi. The depicted stone layers are indicators for a vertical movement (above). The photo in the lower left shows the 3D scanner in use on the archaeological excavation.

For Sodmein a cave volume of around 12,200 m³ was measured, which is nearly consistent with the rubble in front of the cave with about 13,200 m³. The cave is elevated 16 m above the floor of Wadi Sodmein and has a height of around 13 to 15 m.

For this documentation work a time-of-flight laser scanner (Riegl LMS-Z420i) was used in combination with a DGPS for geo-referencing purposes **(fig. 4, below left)**. Thus, TLS derived data can additionally be connected to tachymetric measurements from the archaeological excavations in the cave. Furthermore, a Nikon camera was mounted on top of the scanner in order to deliver photographs, which could later be underlaid with the point clouds from the scanner to deliver coloured images and texture maps.

2.3 Survey in the nearer surrounding

Archaeological field survey in the nearer vicinity revealed in a distance of about 2.5 km south-west of Sodmein Cave some well-preserved remnants of older terrace surfaces with archaeological open air sites. These two different terraces were topographically documented by a DGPS measurement. The northern terrace rises up to 7 m in south-east direction, whereas the southern one is more incised and reaches up to 13 m above the main wadi floor **(fig. 5)**. On the northern as well as on the southern terrace dense surface scatters of Late Pleistocene artefacts and fireplaces were observed. Numerous concentrations of stone artefacts, showing classical Levallois technology as well as Nubian and Taramsan technology, were documented. Hence, these archaeological sites seem to manifest connections between the Egyptian Nile Valley and the Eastern Desert and offer potential for future archaeological research.

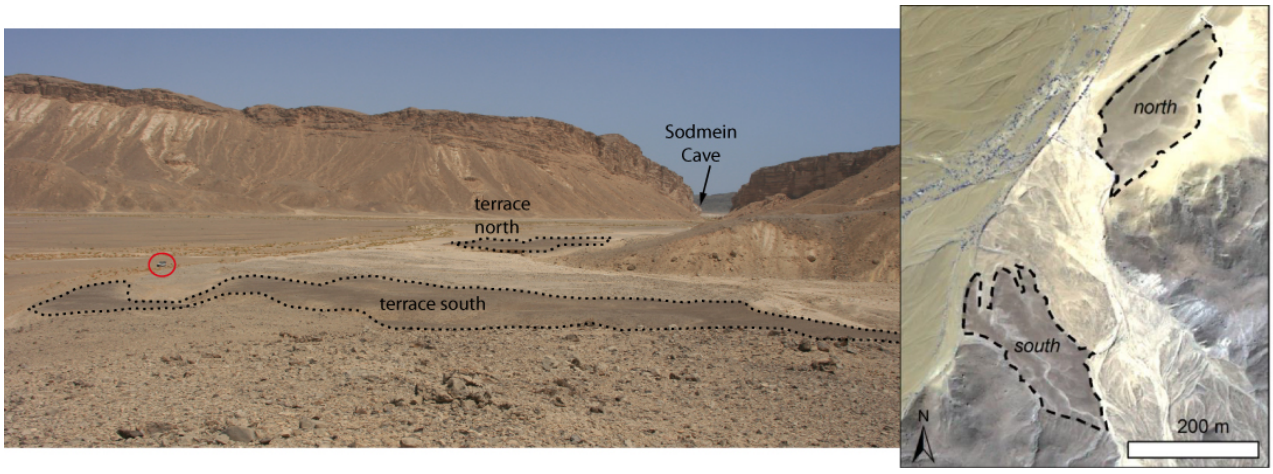

Figure 5. Both images show the position of the older terrace remnants (bordered by dashed lines) in Wadi Sodmein around 2.5 km south-west of the cave entrance. The photograph on the left shows the terraces in the foreground and Sodmein Cave in the background (a car for scale in the red circle), whereas the satellite image on the right displays the detail with the terraces.

3 Preservation measures

Upon reaching Sodmein in autumn 2009, after more than 10 years of discontinued research, it was quite alarming to observe a camp of a quarrying company in front of the cave. Limestone is obtained by heavy machinery directly on the same ridge only a few meters north of the cave entrance **(fig. 6)**. Due to these modern activities, the cave and the archaeological site itself are endangered. Numerous cracks in the ceiling were probably caused by the vibrations that occur during the mining process and could lead to the collapse of the ceiling.

Figure 6. Actual status of the limestone quarrying in Wadi Sodmein, the cave entrance is clearly visible on the left hand side only a few meters away from the mining activities. Limestone is fractured directly on the spot.

In 2009, only a small camp for the miners and some limestone blocks in its vicinity had been observed. The situation changed drastically one year later in autumn 2010 and became more threatening. Numerous rock spurs were tested for future mining activities by heavy machinery, loading ramps were erected, rubbish as well as waste oil was dumped and vast quantities of limestone were quarried **(fig. 6)**, all actions that endangered the site. Concerns have arisen that during the next years a unique Late Pleistocene site in Northeast Africa could be irretrievably destroyed, especially against the background of the demolition of Tree Shelter and its associated archaeological site, only about 4 km further north in the same limestone ridge **(fig. 7)**.

Tree Shelter, named after a solitary acacia tree next to it, was surveyed and excavated during the 1995 field campaign of the BMEPP of the Leuven University under the

direction of P.M. Vermeersch. This site gained importance for understanding the primary introduction of small livestock into North Africa and had been repeatedly occupied – most probably by short-term visits – from about 8000 calBC to about 3700 calBC (Vermeersch 2008). Tree Shelter is among that select handful of archaeological sites from the Early and Middle Holocene in Egypt with a long-lasting stratigraphy and a good preservation of organic material. Upon arriving at the Tree Shelter in September 2010, the site was still in the same condition as it had been left by the BMEPP team after the excavation in 1996 **(fig. 7, left)**. Only one and a half years later, the shelter was destroyed, the trenches were buried by quarried limestone blocks, large parts of the cave ceiling were collapsed and the area around the excavation was furrowed by tracks of a bulldozer **(fig. 7, right)**.

Figure 7. View of Tree Shelter in September 2010 (left), featuring the situation with the former excavation trenches of the BMEPP. The right picture documents the site in April 2012 and shows clearly the destruction of the shelter.

The actual situation in Sodmein Cave and Tree Shelter exemplifies once more the desperately needed preservation measures for remote archaeological sites; especially for the rare and often remote but nonetheless important Pleistocene sites, which are out of sight und thus often out of mind.

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