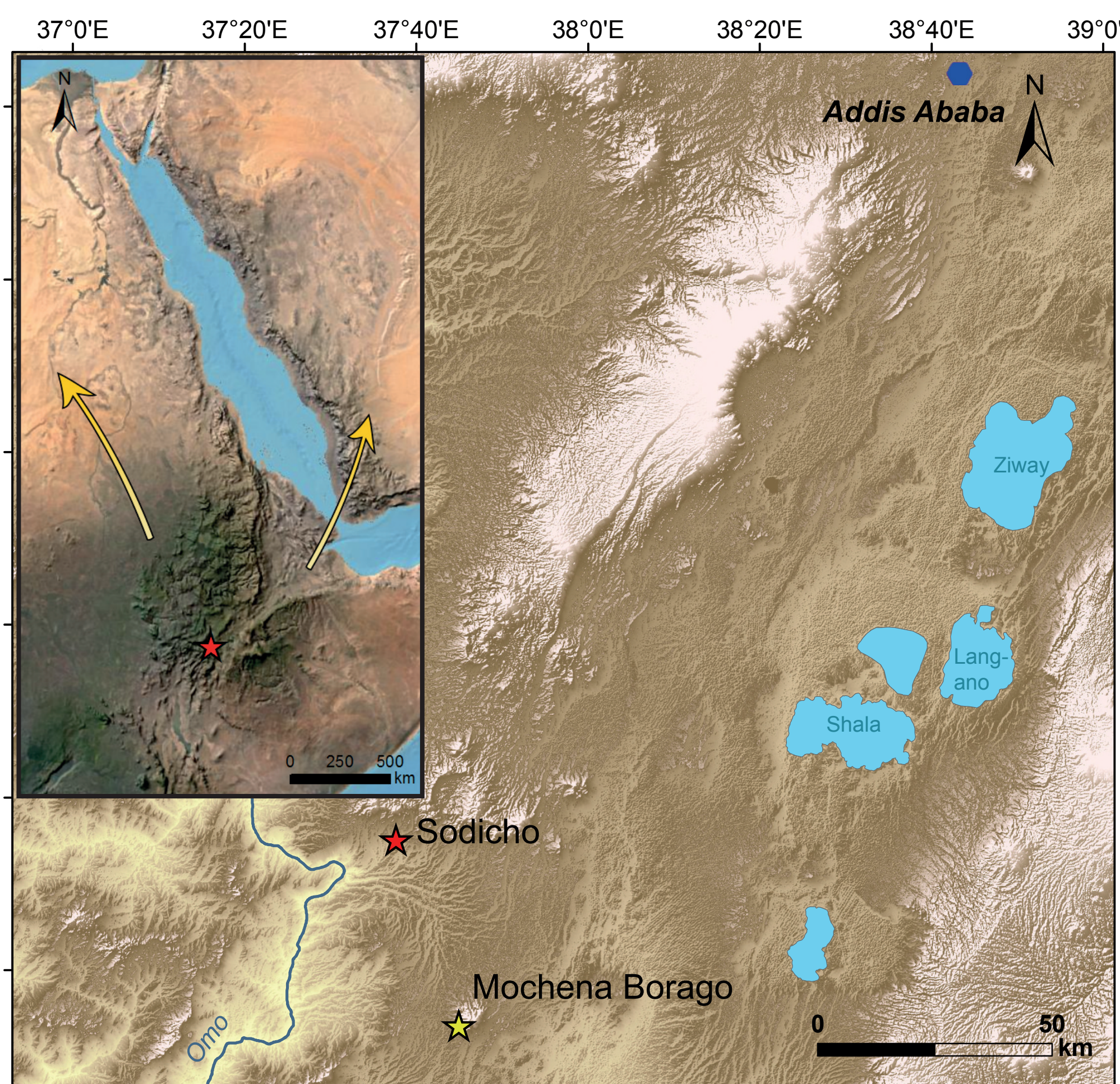


Sodicho Rockshelter and 'Out of Africa II', SW Ethiopia: Initial geoarchaeological investigations

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1. Introduction

The Southwestern Highlands of Ethiopia are hypothesized to have been an environmental refuge during hyper-arid phases in the Late Pleistocene. This area plays a major role for debating and understanding the "Out of Africa II" hypothesis and thus for the evolution and migration of the Anatomic Modern Humans across the African continent and beyond. The Collaborative Research Centre 806 (CRC 806 "Our Way to Europe") focuses on this research. The subproject A1 deals with Late Pleistocene rock shelter stratigraphy and the reconstruction of the palaeoenvironment at sites in Northeastern Africa. The recently discovered site Sodicho Rockshelter will be able to validate and extend this knowledge (Fig.1). Main objects of this doctoral research are geoarchaeological and geomorphological investigations applied on the site as well as on surrounding archives. In the future, this doctoral research will contribute to reconstructing human-environment relations of the Late Pleistocene and testing the theory of SW Ethiopian Highlands as a refugium.

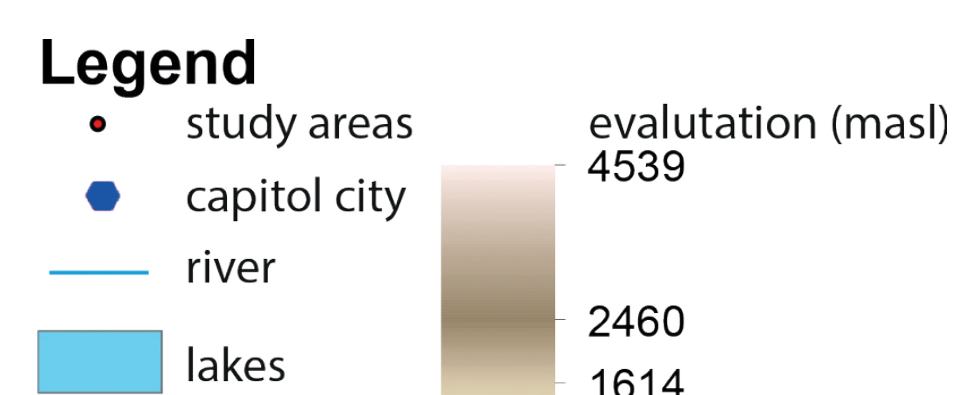


Fig. 1: Geoarchaeological study areas in southwestern Ethiopia with the location of the new Sodicho Rockshelter (right). Possible dispersal routes (yellow arrows) of AMH starting from East Africa; Location of the Sodicho Rockshelter (left) (DEM data by ASTER GDEM & USGS).

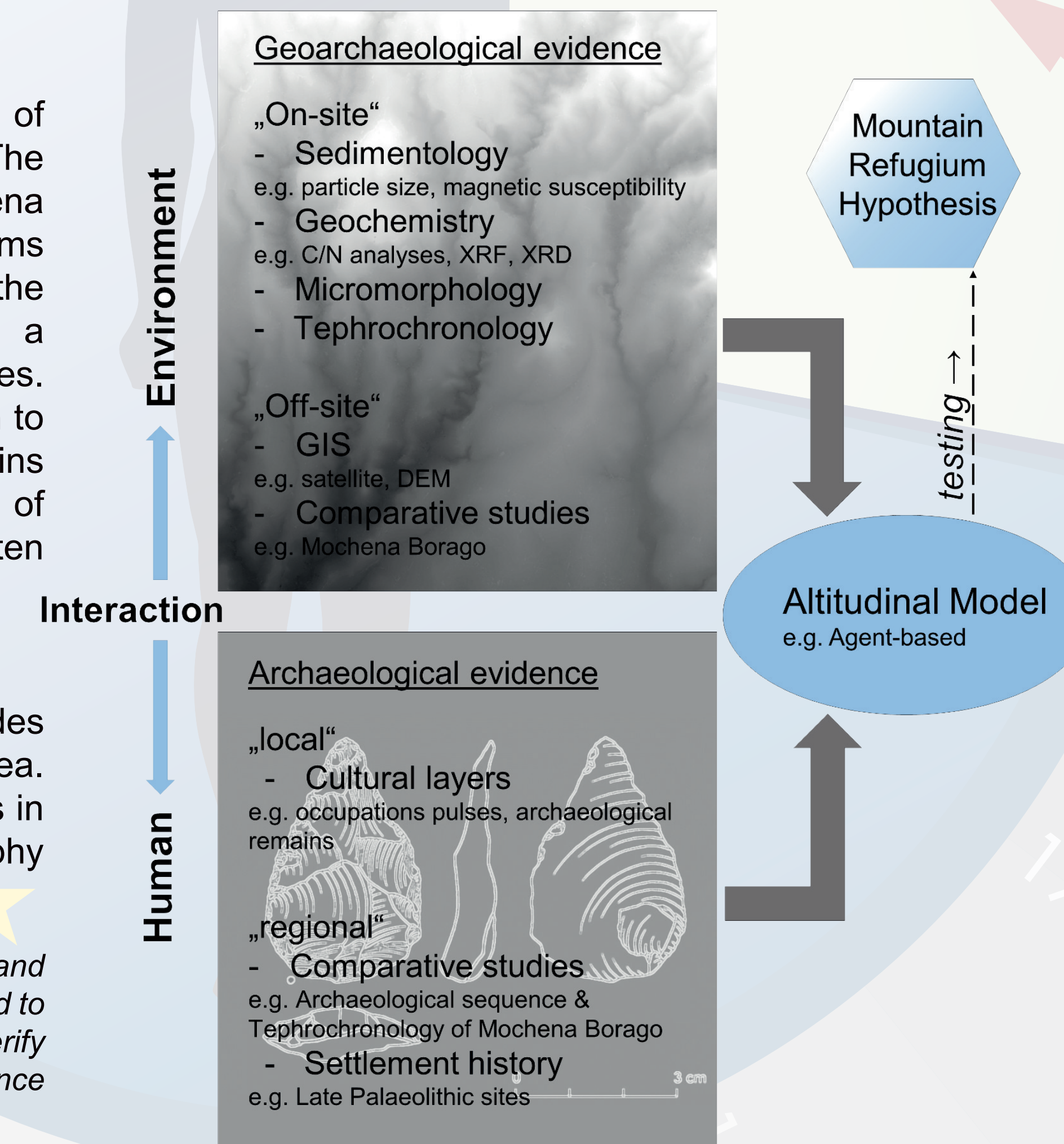
4. Methodological approach

The geoarchaeological investigations at the rock shelter include a selection of sedimentological, micromorphological and geochemical field and lab analyses. The results will be compared to a similar comprehensive stratigraphy (e.g. Mochena Borago) to identify potential sediment sources. Geographical information systems (GIS), esp. satellite imagery will be used as tool for landscape analyses in the different altitudes (Fig. 4). Tephrochronological studies will provide a geochronological tool for linking geological events to the archaeological sequences. For a better understanding of human occupation history and cultural adaptation to this diverse environment the obtained data will be connected to the cultural remains of Sodicho. The aim of this doctoral research is a conceptual, altitudinal model of the regional Ethiopian Highlands via 3D modelling of the land surface to enlighten human occupation history and adaptation to this diverse environment.

5. Outlook

Further field research will be conducted in the following three years. This includes archaeological excavations and geoarchaeological survey of the surrounding area. First micromorphological samples were taken in course of prior test excavations in 2016. Geochemical laboratory work on bulk samples from the sediment stratigraphy are in progress.

Fig. 4: Flow chart of planned geoarchaeological analyses and their interaction with the archaeological evidence. It is intended to gain an altitudinal model of the Ethiopian Highland and to verify the mountain refugium hypothesis (DEM data by Airbus Defence & Space (upper), Stone tools after Brandt et al. 2012 (lower)).



2. Research background and hypothesis

The CRC 806 interprets push and pull factors, Pleistocene population changes and reconstructs past climates with the help of archaeological and geoscientific methods. The research will shed light in possible main migration routes and corridors of our ancestors from Eastern Africa, e.g. along the dry Northeast into the Middle East and Europe (Foerster et al. 2015). Since 2009 the Southwest Ethiopia Archaeological Project (SWEAP) cooperates with the CRC 806 to document and investigate culture-environment interaction and human mobility in the Late Quaternary of the Southwestern Ethiopian Highlands (Brandt et al. 2017). The primarily focus has been the multiple dated key stratigraphy Mochena Borago (Brandt et al. 2012, Tribolo et al. 2017). Research aims are concerning site formation in the rock shelter and sedimentary processes; to clarify human-environment interaction and to contribute to the mountain refugium hypothesis. The hypothesis points out the importance of mountainous environmental refugia for Late Pleistocene populations, coping with the cold and hyper arid conditions in the surrounding lowlands during MIS 4, MIS 2 or the Last Glacial Maximum (LGM) (Brandt et al. 2012, Brandt et al. 2017, Foerster et al. 2015).



Fig. 2: Photograph shows entrance of Sodicho Rockshelter at the southern side of Mount Sodicho (picture by E. Hensel 2017)

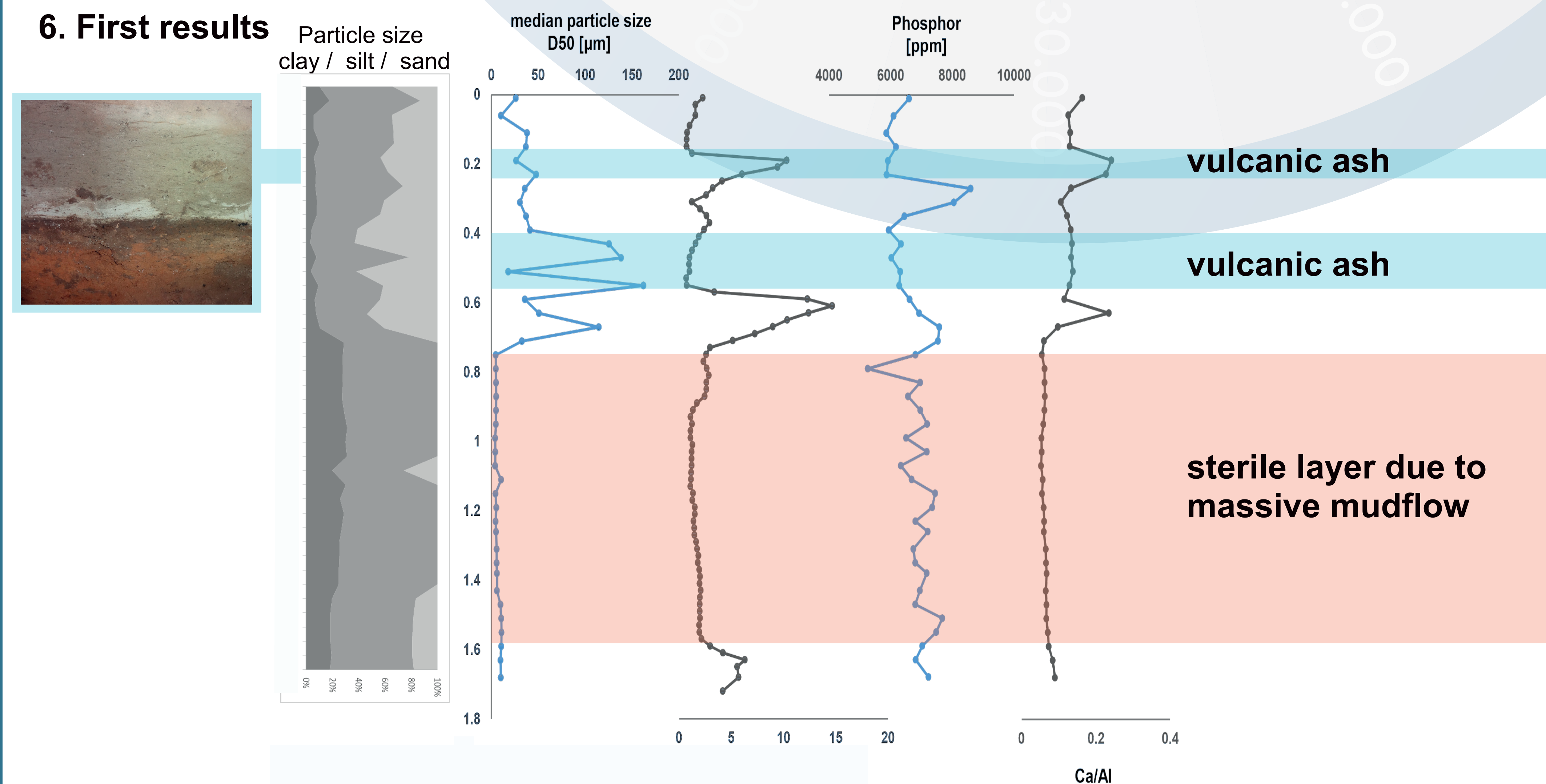
3. The site

The Sodicho Rockshelter is situated at evaluation of 1910 m a.s.l. in the southern flanks of Mount Sodicho (Fig. 2). The volcanic mountain is part of the trachytic Wagebeta Caldera Complex thus the rockshelter walls consist of greyish and bright yellowish trachyte. Archaeological excavations were conducted in 2015, 2016 and 2017 by Dr. Ralf Vogelsang (Institute of Prehistoric Archaeology, University of Cologne) with two squares close to the rear back wall and the western wall (Fig. 3). Excavation opened up a comprehensive stratigraphy and an outstanding preservation of dated later Stone Age horizons (older cultural layers are expected), several hearths, pits and botanical macro remains.



Fig. 3: Photograph shows archaeological excavation from oct./nov. 2017. The influence of water is obvious, indicated by moisture dripping down the ceiling (picture by E. Hensel 2017).

6. First results



Literature:
Brandt, S. A., Fisher, E. C., Hildebrand, E. A., Vogelsang, R., Ambrose, S. H., Lesur, J., & Wang, H. (2012). Early MIS 3 occupation of Mochena Borago Rockshelter, Southwest Ethiopian Highlands: implications for Late Pleistocene archaeology, paleoenvironments and modern human dispersals. *Quaternary International*, 274, 38-54.
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