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## Sedimentology, paleohydrology and geo-archaeology of southeastern Arabia during the Late Pleistocene and its implications for modern human dispersal Out of Africa

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The paleohydrology and geomorphology of southeastern Arabia after 130 ka suggests complex climatic records in the area considered a potential route for human dispersal Out of Africa. Understanding the past hydrological systems is essential to relate the lithic assemblages at the surface to a habitable environment. Climatic records such as speleothems can in combination to sedimentological evidence provide crucial data on the potential formation and persistence of paleo-water bodies and human livelihood. The transition of a more humid period in the past to the presently harsh environment of southeastern Arabia and its relationship with human occupation is one long-term focus of this project. The information on timing, permanency and depth of these paleo-water bodies in Central and Southern Oman are yet lacking.

An initial geo-archaeological investigation has been carried out in south-central Oman (al-Wusūā Governorate) and southern Oman (Dufār Governorate) as part of TSMO (Trilith Stone Monuments of Oman) archaeological expedition During TSMO field campaign. The OSL samples were collected from fluvial, colluvial and valley sediments in the main study area of al-Duqm, south-central Oman, and the reference area of Mudayy, south of Oman in Dufār. At both locations we logged several sediment profiles that mainly consist of well-rounded boulders, imbricated gravels and coarse-grained sediments intercalated with sporadic sand lenses. The sediments suggest fluvial transport in a perennial river and differ significantly from today's ubiquitous angular Wadi-sediments. At both locations we found reddish sediment that might originate from fluvially reworked soil and would indicate not only the presence of water but also enough moisture to facilitate soil forming

processes. Preliminary XRD scans from samples in Ūufār identified calcite, quartz, feldspar and the sheet silicates illite and kaolinite. The clay fraction of this material has been separated and analyzed to determine the exact minerals that might be typical for soil formation in the B-horizon. Sediments in the Mudayy area are – similarly to al-Duqm - composed of river sediments with well-rounded imbricated gravels but in contrast to further north, they are covered by aeolian (loess) sediments. This captures the transition of fluvial deposition to aeolian deposition and thus a transition of the environmental setting during the time of formation. The Mudayy area in southern Oman is associated with Middle Paleolithic lithic tools of Levallios/Nubian complex technology as well as early-middle Holocene stone tools. The main research area of al-Duqm revealed several new Middle Palaeolithic sites with preferential Levallois facie with some influence of Nubian complex suggesting the landscape with favorable local environmental conditions, forming a possible human refugium between the harsh northern and southern borderlands. The understanding of Quaternary geomorphic, sediment and erosion processes, paleoclimate reconstruction, techno-typological analysis of lithic tools and cosmogenic nuclide dating of the raw material procurement sites in al-Duqm can shed more light on occupation and movement of human population on Arabian Peninsula during the Late Pleistocene.