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Chronology of the Middle Stone Age sequence at Sodmein Cave (Egypt) and palaeoenvironmental implications

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Sodmein Cave in the Red Sea Mountains in Egypt is one of only two archaeological sites (alongside Haua Fteah Cave in Libya) in Northeast Africa that document stratified deposits of human occupation from the Middle Stone Age to the Neolithic. The research in the Eastern Desert of Egypt investigates the dispersal of Anatomically Modern Humans (AMH) from Africa to Eurasia. The region plays a key role in the current debate about the presence of AMH in the, today, hyper-arid desert belt of Northeast Africa and the Arabian Peninsula. Sodmein Cave is expected to give important information about migration along the northern route. The chronology of the site is so far based on thermoluminescence dating (TL) of heated artefacts that have been associated with lithics of the Early Nubian technology and radiocarbon dating in the upper part of the sequence (Moeyersons et al., 2002). The TL ages scatter between 87 and < 121 ka (Mercier et al., 1999, Schmidt et al., 2015).
We collected sediment samples for optically stimulated luminescence (OSL) dating from layers I, G2 and G1, to further investigate the time of human occupation in Sodmein Cave. We applied multiple grain dating of quartz and feldspar (infrared stimulated luminescence measured at 50 °C and corrected for anomalous fading, i.e. IR50; post infrared infrared stimulated luminescence dating measured at 290°C, i.e. pIRIR290) to achieve a comprehensive chronology. The quartz and feldspar grains are of aeolian origin, which was proved by grain size and thin section analysis. Therefore, we expect complete bleaching of the luminescence signals prior to deposition. Dose rate determination was carried out by HPGe γ-spectrometry and complemented by in-situ NaI-spectrometry to account for heterogeneities in the sediment composition. The quartz OSL signal of the lowermost sample (layer I) was in saturation. The OSL signals of the two other quartz samples (layer G2 and G1) were partly saturated and we regard these results as minimum ages. Feldspar ages based on pIRIR290 dating are roughly between 70 ka (layer G1, G2) and 110 ka (layer I). This supports the previous studies on the technology and typology of the stone artefacts which have attested human presence in Sodmein Cave during the prominent wet phase of OIS 5e. Furthermore, the results strengthen the hypothesis, that humans have also been present during the shorter wet phases of OIS 5c and 5a.

References

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