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Climate conditions at the Horn of Africa and opportunities for modern human dispersal

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Recent archeological and genetic evidence suggests that anatomically modern humans migrated out of Africa potentially as early as ~220,000 years B.P. Understanding the dynamics of cultural, technological and societal evolution of *Homo sapiens* needs profound knowledge of associated environmental conditions. To better understand how and why migrations occurred, a detailed framework of hydroclimatic conditions, vegetation and land cover are needed. However, interpretations of terrestrial and marine proxy records often differ significantly and high-resolution data are scarce.

Here we present new results of from a 22 m long marine hemipelagic sediment core from the Gulf of Aden. The Gulf is surrounded by East African and Southern Arabian landmasses and in close proximity to key archaeological sites. The record provides a continuous, detailed and well-dated reconstruction of terrestrial and marine climate change over the last ~550,000 years, spanning the entire history of human evolution from Early Stone Age to the Holocene. The core offers a sampling resolution of ~250 years, enabling robust estimations of cyclic climate modulations and potential forcing mechanisms. We used geochemical proxies (XRF) indicative of dust input and aridity on land, marine productivity and monsoon intensity in comparison with high-resolution speleothem records on land. Our results indicate that climate change was strongly modulated on ~100-ka eccentricity and ~20-ka precessional bandwidth. The data further allows to study the pattern and development of climate fluctuations during Holocene-like interglacials as potential analogs for future climate change in this densely populated region.