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Gradual and small decrease of glacial sea surface temperatures in the eastern equatorial Indian ocean across the Mid-Pleistocene Transition

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The Mid-Pleistocene Transition (MPT), between about 1.2 and 0.7 Ma, is characterized by the emergence of asymmetric, high-amplitude 100 ka cycles, which contrast with the low amplitude, 41 kyr cycles that dominate the early Pleistocene climate. Here, we study the sediment core MD12-3409, which spans the last $\sim$ 1.75 Ma, to document hydrographic changes across the MPT in the Eastern Equatorial Indian Ocean. Stratigraphy is based on benthic foraminifera delta18O and we reconstruct Sea Surface Temperatures (SST) using the Mg/Ca ratio of Globigerinoides ruber, a surface dwelling planktonic foraminifera.
Our results reveal a progressive cooling of glacial maxima across the MPT but no long-term trend in mean SST over the last 1.75 Ma. The main periodicity of the surface temperature signal shifts from 41 kyr before the MPT, to both 100 kyr and 41 kyr for the post MPT time period.
Over the last 800 ka, the strong correlation between core MD12-3409 SST fluctuations and the atmospheric CO_2 record suggests a global, greenhouse forcing for the tropical Indian SST over the post-MPT time period. Within the MPT, and for earlier time interval, changes in temperature gradients between our SST record and other temperature records in, or at the edge of, the Pacific Warm Pool, could suggest reorganizations of sea surface circulation and lateral heat exchanges. Since the MPT, the amplification of sea level lowering during glacial periods might have shoaled the Indonesian Through Flow (ITF) gateway, restricting hydrographic exchanges between Pacific and Indian oceans.