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Linking NW-African climate and sea-surface temperature variations off Senegal during the late Holocene

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Recent studies suggest a close linkage between the regional distribution of sea-surface temperatures and precipitation patterns over Africa. However, neither the temporal and the spatial extent, nor the exact nature of this interaction between sea-surface temperatures and the hydrologic cycle during the Holocene are sufficiently explored.

A high-resolution sediment core (sedimentation rates up to $\sim$ 600 cm/kyr) retrieved in 49 m water depth from the Senegal mudbelt was studied in order to reconstruct relationships between sea-surface temperature (SST) and continental climate. Biomarker-based records of SST and terrigenous plant-input are presented along with oxygen isotopes and major element counts from XRF-scanning. The record covers the time interval of approximately 1000 to 4500 years BP.

We observe a major cold episode between 4000 and 2000 years BP. SST dropped by about 2˚C during this interval. The lowest values were reached around 2600 years BP. The decline in temperature is paralleled by an increase in concentrations of terrigenous biomarkers and Fe. Fe/Ca ratios indicative of terrigenous material contribution reveal an enhanced variability at multidecadal-to-century timescales during the warming after 2600 yr BP.

Our data suggest a strong correlation between local SST and African humidity. Phases of continental aridity as reconstructed from African lake-levels coincide with cold sea-surface temperatures at our study site, while Atlantic warm phases are also recorded

in our core.