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The southern African expression of the AHP (African Humid Period): evidence from offshore Maputo (ca. 20-25°S)

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Abstract From existing paleorecords, it remains unclear if Late Quaternary climate variability in the southeast African subtropics is in phase with southern or northern hemisphere climate trends. Several regional studies have suggested a synchronicity with the southern hemisphere and thus inferred a direct insolation forcing while others have observed a synchronicity with northern hemispheric climate and associated this with a teleconnection mechanism. These discrepancies between records are likely in part due to the regional complexity at the interface of tropical and temperate climate systems, but also to the lack of continuous, high resolution datasets. Filling this gap, we present a continuous and well-resolved record of climatic variability for the past 45,000 years from a marine sediment core (25°35'S/33°20'E; 460m waterdepth) taken off the Limpopo River mouth. Climate sensitive organic proxies, like the distribution and isotopic composition of plant-wax lipids as well as elemental indicators for fluvial input provide information on climatic changes in the catchment area. The most prominent feature of the record is an abrupt increase in Fe/Ca values associated with a decrease in δD of plant waxes around 15 ka cal BP (termination 1a). This suggests an increase in precipitation and, thus, river discharge. This period of high discharge / high precipitation rather abruptly ends around 5.5 ka BP. The timing of this humid period in the Limpopo catchment corresponds to 'African Humid Period', defined in northern Africa. Although several records from the southeast African interior suggest aridification during this period, the gross of the southeast African coastal records are in accordance with the increase in precipitation that our record infers. As many regional records are limited to the Holocene and often discontinuous, poorly dated or resolved, our record is the first to document the temporal coherence between the AHP observed in northern Africa and the humid period in (coastal) south-eastern Africa. Thus far, the occurrence of a southern hemispheric humid expression during the AHP has been limited to southern equatorial Africa and mainly explained by rising Mozambique Channel sea surface temperatures (SSTs). This is in contradiction to the general consensus that the AHP occurred in response to increasing local insolation. Our record supplies evidence that additional (global) drivers must have played a considerable role in triggering the AHP.