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Mosselbay environmental conditions and sea-surface temperature fluctuations during the Late Holocene

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Within the BMBF funded project RAiN (Regional Archives for Integrated iNvestigations), we aim to simultaneously reconstruct ocean and atmospheric variability of in the South African region using marine records at the continental – marine interface. In this study we analyze core GeoB18308-1 retrieved from Mossel Bay (34°22.389'S 21°55.747'E) during RV Meteor cruise M102 which offers the possibility to study marine sediments spanning a time interval of the past ∼4000 years. The unique position of the core site directly offshore the Gouritz River mouth allows for a combined analysis of variability in marine processes as well as terrestrial input. Several organic proxies sensitive to changes in climatic parameters like the distribution and isotopic composition of leaf wax n-alkanes as well as TEX86 and BIT-Index from microorganism's membrane lipids give insight in climatic changes during the investigated time period. Moreover, the mineralogical and elemental composition of the sediment provides additional information on sediment transport processes to the core site as well as the depositional processes. The study of the mineralogical signature of sand to silt size sediments will allow us to better identify the provenance of detritus and the possible role of the Aghulas current carrying sediment to the study area. Measurements were not only performed downcore, but also on Gouritz River catchment material for ground-truthing in a source to sink approach. This multi-proxy study shows the importance of Southern Hemispheric Westerlies (SHW). Furthermore, it offers high resolution data to test the regional conceptual model proposed by Cohen and Tyson (1995) during short term climatic anomalies. In accordance with this conceptual model, preliminary results indicate that the the so-called Medieval Climate Optimum is characterized as warm and humid in this region between the eastern Summer and western Winter Rainfall Zone with highly variable SSTs in the Mossel Bay area. At our current stage of research, we attribute this to a southward shift of the SHW and a strengthening in Aghulas current speed during this period.

Cohen, A.L. and Tyson, P.D., 1995. Sea-surface temperature fluctuations during the Holocene off the south coast of Africa: implications for terrestrial climate and rainfall. The Holocene 5 (3), 304-312.