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Late Quaternary environmental and oceanographical change in the Mozambique Channel (east Africa): a palynological approach

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The southwestern Indian Ocean is greatly influenced by the Agulhas Current. At Cape Agulhas eddies - so-called Agulhas rings - occasionally flow into the Atlantic Ocean, instead of retroflecting into the Agulhas Return Current. This process is called Agulhas leakage. A strong 100-kyr periodicity, related to the glacial-interglacial cycles, has been found in fauna characterizing Agulhas leakage water. Agulhas leakage might therefore play an important role in the termination of glacials, because its waters are warmer and more saline and may influence the entire Meridional Overturning Circulation (MOC). However, interacting oceanographical processes between Indian and Atlantic Ocean are still poorly understood.

The Indian-Atlantic Exchange in present and past climate (INATEX) project aims to elucidate this process and its effects on different spatial and temporal scales. During the INATEX-GEO cruise (March 2009) several piston cores were retrieved from the Mozambique Channel, where the Agulhas current originates. Preliminary analyses indicated that core PE304-80 ($\sim$1200 cm long, $\sim$1300 m water depth) is particularly interesting, since it shows the longest and most continuous record, covering the last ca. 50,000 years (Marine Isotope Stages 1-3) and contains expanded Last Glacial Maximum and Holocene records.

We have performed a preliminary marine palynological study on this core as part of a large multi-proxy study, involving a.o. isotope and organic and inorganic geochemistry. Our study represents the first marine, late Quaternary palynological record available from this area. By coupling information derived from pollen and spores (remains of terrestrial vegetation) and dinoflagellate cysts (remains of unicellular marine planktonic organisms) deposited in the same sediments we are able to simultaneously reconstruct the changes in the terrestrial and marine environment through time.

From the Last Glacial Maximum onwards lagoonal euryaline environments where mangroves grew developed, whilst further deglaciation and subsequent sea level rise into the Holocene created more oligotrophic open water conditions. Our information, together with that from other proxies, will eventually unravel the environmental (e.g., temperature, salinity, productivity) changes occurred during the last 50,000 years, improving our understanding of the links between climate change and water exchange between the Indian and Atlantic Ocean, likely important for the entire (global) ocean circulation.