

Holocene sedimentation processes and environmental changes along the Namibian coastline

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The regional oceanic and atmospheric circulation patterns strongly control environmental conditions in southern Africa. Changes in the system may have significant consequences on climate and related processes. The hyper arid coast of Namibia is mainly influenced by (1) the cold Benguela upwelling, (2) the Benguela current and (3) the Angola current. The Benguela current transports the cool, upwelling water from south to north and interacts with the warm, contrary flowing Angola current at the Angola-Benguela Front (ABF). Today the ABF is located around the Namibian-Angolan border with minor seasonal changes. Therefore, climate and environment at the Namibian coast are affected by the cold water conditions. It is known evidently that the location of the ABF changed during the Holocene over several latitudes and enabled warm water species to expand their range farther south.

Several (paleo-) lagoons (coastal salt pans) exist along the Namibian coastline. Most of them are already barred and filled by longshore sediment transport processes. Tidal flooding and active sedimentation processes are restricted to the southernmost lagoons. Two different types of sediments occur. The northern pans contain well sorted, siliclastic medium sands. Fine-layered alternation refers to changes in mineral composition. The southern pans are dominated by typical tidal sediments with a high amount of benthic fauna (mainly bivalves and gastropods). At Cape Cross the distinct shift between both facies is documented in the cores. Age determinations of core material prove a very fast sediment filling of the distinct lagoons with high sedimentation rates. However, the age of closure differs from lagoon to lagoon. Northern pan sediments are much older (Cape Cross: ~ 5000 a BP) than southern (Sandwich Bay and Conception Bay: 1800 - 300 a BP). Additional information are supported by river clay deposits (~ 36600 a BP) and fossil reed systems (~ 47900 a BP) in Conception Bay and peat deposits at the fossil Kuiseb delta between Walvis Bay and Sandwich Bay (~ 1350 - 750 a BP).

The results of our analyses of lagoon and pan sediments as well as the fossil remnants allow the reconstruction of coastal sedimentation processes as well as the associated Holocene environmental changes at the coast and the terrestrial hinterland.