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Modern and ancient lagoons of the Namibian coast: sedimentation processes and environmental changes

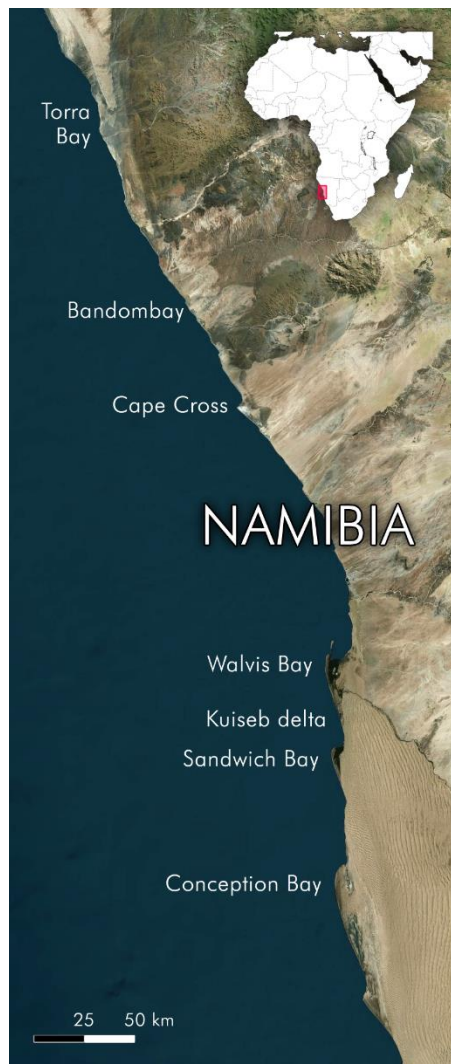
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The regional oceanic and atmospheric circulation patterns strongly control environmental conditions in southern Africa. Changes in the system may have significant consequences on climate and related processes. The hyper-arid coast of Namibia is mainly 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 intensely 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, siliciclastic 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: ~ 5,000 aBP) than southern (Sandwich Bay and Conception Bay: 1,800 - 300 aBP). Additional information are supported by river clay deposits (~ 36,600 aBP) and fossil reed systems (~ 47,900 aBP) in Conception Bay and massive peat deposits at the former Kuiseb delta between Walvis Bay and Sandwich Bay (deposition between 1,350 - 750 aBP).

Figure 1: Investigated (paleo-) lagoons and salt pans along the Namibian coast (map source: Bing Maps, 2016).

