

The potential of coastal lakes in the Winter-Rainfall-Zone of South Africa for paleoenvironmental reconstructions – an example from Verlorenvlei

Thomas Kasper (1), Torsten Haberzettl (1), Martin Lederer (1), Michael Wündsich (1), Peter Frenzel (2), Matthias Zabel (3), Kelly Kirsten (4,1), Andrew Carr (5), Gerhard Daut (1), Hayley Cawthra (6,7), Jussi Baade (1), Michael Meadows (4), Lynne Quick (4), and Roland Mäusbcher (1)

(1) Physical Geography, Institute of Geography, Friedrich Schiller University Jena, Jena, Germany, (2) Institute of Geosciences, Friedrich Schiller University Jena, Jena, Germany, (3) MARUM – Center for Marine Environmental Sciences, University of Bremen, Bremen, Germany, (4) Department of Environmental and Geographical Science, University of Cape Town, Cape Town, South Africa, (5) Department of Geography, University of Leicester, Leicester, United Kingdom, (6) Marine Geoscience Unit, Council for Geoscience, Bellville, Cape Town, South Africa, (7) Centre for Coastal Palaeoscience, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa

Verlorenvlei is a coastal lake in the winter rainfall zone of the Western Cape Province of South Africa. Up to now, several attempts have been made to recover sediment cores from this lake. However, no continuous high-resolution record covering the entire Holocene has been acquired. Within the project RAIN (Regional Archives for Integrated iNvestigations) a 14.2 m paired parallel core from the central part of Verlorenvlei was recovered. Based on analyses of surface sediment samples, recent elemental and grain size distributions indicate that this sediment core is well suited for paleoenvironmental reconstructions. Using a set of 23 radiocarbon ages, a chronology was established for the past 9,400 cal BP suggesting continuous sediment deposition throughout the entire period.

Preliminary lithological and geochemical investigations show that this record can be used for sea level reconstructions as the lake was periodically inundated by the ocean during the past 9,400 cal BP. This is recorded in distinctly elevated Ca and Sr contents as well as the occurrence of marine indicator species (gastropods) in parts of the sediment core. Thin, pale grey layers of fine sediment occurring at various sediment depths seem to reflect event-related deposits, but do not show erosional structures. In terms of lithology, geochemical and magnetic composition, the upper 50 cm (ca. 100 cal BP) clearly differ from the rest of the record indicating increased sediment supply from the catchment, which is likely linked to anthropogenic activities.

The presented sediment record from Verlorenvlei offers excellent potential for a detailed, high-resolution reconstruction of sea level changes, climate variations and anthropogenic impact during the past 9,400 cal BP in an area in which natural archives are very scarce or poorly dated.