



Fossil marl prairie as indicator for aridification and coastal uplift in equatorial East Africa during the last glaciation

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Facies analyses of Pleistocene deposits from southern coastal Tanzania (Lindi District) document that sediments have formed in a wetland that developed on a coastal terrace in front of the Lindi Fracture Zone. The exposed sedimentary succession reveals one transgression/regression cycle. A rising relative sea level is indicated by back-stepping tidal flats. The overlying palustrine limestones were precipitated in a marl prairie that developed due to falling relative sea level. In marl prairies, carbonate precipitates seasonally in barely flooded grasslands within periphyton mats. Despite the special mode of carbonate production descriptions of the sedimentary facies are cursory because marl prairies are so far reported only from the Recent Everglades (Florida/USA) where they produce an unspectacular calcite mud. The Pleistocene marl prairie from Africa is the first fossil example and, in contrast to the Everglades marl prairies, the periphyton is excellently preserved because of a better calcification of the associated cyanobacteria. The unique preservation allows us to characterize a marl prairie facies in great detail for the first time. Located at the interface between land and sea marl prairies are sensitive to changes in water balance and a useful recorder for climate and sea level changes. Radiocarbon dating of *Assiminea* gastropods from the studied sediments reveal the emergence of the coastal terrace started at ~44 ka BP. This coincides with a eustatic sea level fall prior to the last glaciation maximum and a phase of tectonic uplift at the Lindi Fracture Zone. Along the entire coast of Tanzania terraces were periodically elevated due to extensional episodes in the eastern branch of the East African Rift System during the Quaternary. However, the exact timing of these tectonic pulses was so far impossible. Our results show that the emergence of the Lindi coast was linked to a period of tectonic activity in the East African Rift System after ~50 ka. The decline of the marl prairie was initiated at ~33 ka BP due to the onset of the Last Glacial Aridity Maximum in equatorial East Africa.