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New sedimentological evidence of Lake Victoria's palaeohydrological variability during the last deglacial transition (16-10 kyr BP)

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The East African (hydro-)climate response to perturbations during the deglacial transition (e.g. Older and Younger Dryas) is complex and expressed heterogeneously in different paleoclimatic records. Lake Victoria (LV), Africa's largest lake, desiccated entirely during the dry last glacial (>16.3 kyr BP) and subsequently refilled as climate conditions got more humid, reaching a highstand during the Early Holocene. However, existing sediment records from LV do not have sufficient resolution to fully resolve short-term hydroclimate changes during the deglacial transition (especially between 14 and 11 kyr BP). There is little direct evidence of late-glacial lake level fluctuations in LV so far because intermediate water depth coring sites suitable to record intermittent lowstands are missing.

By analysing sediment cores along a near-shore/shallow water (current water depth 22 m) to offshore/deep water (current water depth 63 m) coring transect covering the past 16,000 years, we aim at a more accurate spatial and temporal reconstruction of LV's deglacial lake level history in response to regional hydroclimate changes.

Core stratigraphy and geochemical evidence, combined with a robust radiocarbon chronology, demonstrate a stepwise infilling of the Lake Victoria basin after its last complete desiccation (< 16.3 kyr BP). Following the dry late glacial Heinrich 1 event, an intermediate water level prevailed between 16.3 and 14.4 kyr BP, with uninterrupted deposition of fine-grained, organic matter-rich pelagic muds at our deep-water site and coarser, sandy-clay deposits at the near shore site. A second dry episode during the Older Dryas (~14 kyr BP) is marked by an abrupt decline in lake level with deposition of coarse mollusc shell bearing sediments at the near shore site indicating a littoral depositional environment. This shift in hydroclimate in the Lake Victoria basin is congruent with a brief period of cooling and drying during the Bölling/Alleröd (Dansgaard Oeschger Event 1), which is also recorded in other East African Lakes. Subsequently, Lake Victoria reached maximum water levels with the onset of the African Humid Period in the early Holocene at around 11 kyr BP, which is expressed by elevated input of chemically weathered material (e.g. Rb/K) and deposition of fine-grained muds at both the near shore and offshore sites.

