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Major climatic changes in equatorial East Africa during the late Pleistocene and Holocene: reconstruction from paleo-shorelines in the Suguta Valley, northern Kenya Rift

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One of the major problems in understanding the climate history of tropical environments involves the correct assessment and the identification of mechanistic principles associated with transitional episodes between climatic extremes. This problem is often compounded by the lack of well-preserved, datable and reliable paleo-environmental records. The northern Kenya Rift hosts rich paleo-environmental records exposed at surface and available for inspection. The Suguta Valley of the northern Kenya Rift constitutes a number of small sub-basins. Here, evidence of pronounced repeated hydrological changes during the late Pleistocene and Holocene are manifested in a rich record of fluvio-lacustrine sediments and several levels of paleo-lake shorelines. To constrain spatiotemporal trends in the high lake phases in the Suguta Valley, we mapped elevation and extent of paleo-shorelines using a high-resolution differential GPS. The highest, and most prominent paleo-shoreline was consistently mapped at ca. 550$\pm$10 m a.s.l. Compared to the presently 3-5 m maximum depth of the seasonal Lake Logipi at the northern end of the Suguta Valley (ca. 275 m a.s.l), the paleo-lake Suguta was at least 280 m deep, with a volume of 350 km^3, and covering an area of more than 2,000 km^2. This suggests that the hydrological balance during that high-stand was dramatically different compared to the present-day, undoubtedly forced by a

much wetter climate. Seventeen AMS ^{14}C dates measured on snail shells (*Melanoides* sp.) from lake sediments associated with the highest paleo-shoreline cluster between 16,900 and 10,550 cal. yr BP. This indicates that the Suguta mega-lake phase existed at the beginning of the 'African Humid Period' (spanning ca. 15,500-5,500 cal. yr BP), thought to represent a tropical response to the last glacial-interglacial transition of the mid- and high-latitudes. This transition is interpreted to have been associated with a strong increase in air temperatures. To estimate the timing of the following lake regression, corresponding to the onset of the present-day arid climate, we will intensify our dating effort and determine the ages of sand dunes from the Suguta Valley floor by using the optically stimulated luminescence method (OSL). We expect that the well-dated paleo-shorelines and sand dunes, as well as accompanying analysis of lacustrine sequences will help us to test the hypothesis of an abrupt onset and termination of the 'African Humid Period' as a nonlinear response to gradual insolation forcing.