Climate-driven dynamics of early Pleistocene Lake Lorenyang (Turkana Basin, Kenya) inferred from strontium isotopes. African Quaternary Association Meeting, Nairobi, Kenya, 14-22 July 2018

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The Lorenyang Lake phase (2.1-1.6 Ma) document environmental and climatic dynamics within the Turkana Basin during a key interval in human evolution comprising the first appearances of Acheulian stone tools and Homo erectus. Expanded sedimentary outcrop successions record vast fluctuations in depositional environment and lake-level along the eastern margin of paleo-lake Lorenyang. Analysis of lithogenic grain-size distributions reveals coarse-grained end-members, which are absent in synchronous deposits of the western margin. The coarse-grained sediments are attributed to relatively shallow water depths and the proximity of river mouths. The dynamic nature is also evident in the western succession with lacustrine clays that are repetitively overprinted by soil features and alternate with coarser sediments. As part of the Hominin Sites and Paleo-lakes Drilling Project (HSPDP, 2013), core WTK-13 was retrieved near the investigated outcrops at western margin. Age control and stratigraphic linkages between core and outcrop are based on tephrastratigraphy and paleo-magnetism. The deposits are rich in molluscs, ostracods and fish remains, which have been analysed to establish a strontium isotope ( 87Sr/Sr86) stratigraphy for Lake Lorenyang. Unlike carbon and oxygen isotopes, 87Sr/Sr86 values directly reflect the 87Sr/Sr86 composition of the organism’s host-water, which is insensitive for short-term variability. For the Turkana Basin, 87Sr/Sr86 records reflect runoff fluctuations between sub-drainages with dominantly Precambrian and younger volcanic bedrock. The 87Sr/Sr86 record indicates a strong control of the Omo River with a varying contribution of more radiogenic rivers (e.g. Kerio-Turkwel), which is probably related to shifts in the monsoon rainfall belts. Anomalous low 87Sr/Sr86 values that are tentatively linked to overflow from the volcanic Suguta Valley occur in outcrops and core. The 87Sr/Sr86 records therefore not only resolve the influence of climatic controls on Paleo-lake Lorenyang, but also the correlation between core-outcrop records. This 87Sr/Sr86 approach might also applicable to other East African Rift lakes.