



Climate-driven lacustrine dynamics from the Early Pleistocene Lorenyang Lake, Turkana Basin, Kenya

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Two stratigraphic records from Kaitio in West Turkana, Kenya, span 1.87 - 1.34 Ma, and document environmental character and variability through a critical interval for human evolution and cultural development. The WTK13 core collected by the Hominin Sites and Paleolakes Drilling Project (HSPDP) recovered 216 m of sediment at 95% recovery. A parallel outcrop record of 180 m was investigated in exposures along the Kaitio laga close to the drill site. Six tephrostratigraphic markers, the Chari, Lokapetamoi, 22Q-3, Etirr, Ebei and KBS Tuffs are present in the outcrop and/or core. These were characterized by single-shard geochemical analysis, and provide links to the well-established tephrochronology of the Turkana Basin. Magnetic polarity stratigraphy of the two records documents the top of the Olduvai Subchron (C2N) at 1.78 Ma.

The lithostratigraphic record, bolstered by magnetic susceptibility and sedimentary facies characterization, demonstrates a first-order transition from a deeper lacustrine system to a dynamic lake margin setting, followed by delta progradation. Facies analysis reveals repeated fluctuations of lake level at Milankovitch and sub-Milankovitch scales. Core-outcrop correlation allows detailed comparisons between diagenetically-prone outcrop samples and more pristine samples from the deep core. The excellent preservation of the core sediments makes it possible to obtain critical climate records of organic biomarkers, pollen, phytoliths and other proxies.

This detailed archive of environmental variability is closely linked to the rich paleontological and archaeological discoveries from nearby sites and around the Turkana Basin.