199 Scott, J., Stockhecke, M., Deino, A., Kingston, J., Westover, K.,and Cohen, A.S., 2019, Sequence-stratigraphic and X-ray fluorescence characterization of lake transgression-regression cycles at the late Pliocene to Pleistocene transition, central Kenya Rift valley. AGU Annual Fall Mtg., San Francisco, CA, PP44A-09.

The late Pliocene to early Pleistocene Baringo Basin long drill core (ICDP HSPDP project) from the central Kenya Rift records cyclical fluctuations from deep lake to marginal environments between ~3.3–2.6 Ma, intercalated with thick packages of alluvial sediments. High-resolution sedimentology and ichnology (cm-scale) were used to recognize discontinuities and packaging of facies representing changing paleoenvironments. Sequence stratigraphy was applied to delineate discrete chronostratigraphic surfaces representing transgression (TS), forced regression (RS), and lowest base-level (SB) through the succession. Elemental composition measured by continuous scanning X-ray fluorescence at 1 cm intervals corresponds to stratigraphic packaging. A sharp decrease in K and Ti is observed at most transgressive surfaces, followed by progradation with gradually increasing K and Ti, and forced regression with a sharp increase in K and Ti. Together with Fe, these clastic indicators characterize the patterns of sediment supply to the lake. Lake expansion is represented by high Si/Ti, low magnetic susceptibility, and a high ratio of incoherent/coherent scattering (a bulk measure of organic matter and sediment density). A high-resolution Bayesian stratigraphic age model based on $^{39}Ar/^{40}Ar$ dating of tuffs and magnetostratigraphic boundaries (Deino et al., 2019) was then applied to determine the periodicity of events. Sequence boundaries and transgressive surfaces in lacustrine intervals are spaced at a precessional scale ~23 ka, with the deeper lakes corresponding to 100 ka eccentricity maxima, and sets of lake expansion-contraction cycles corresponding to highs in 400 ky eccentricity. Some packages may also record the influence of ~40 ky obliquity, from ~3.15–2.95 Ma. Precession-scale lake cycles are observed from ~3.18 Ma, associated with high 100 ky eccentricity. The most cyclic and regular packages, from ~2.75–2.58, represent an increase in water and sediment input to the basin corresponding to the highest amplitude insolation maxima. A major change in environments at ~3.04 Ma, from alluvial-dominated to fluctuating deeper lakes, may be due to regional or global climatic influences which fostered greater precipitation/reduced evaporation during lacustrine intervals.