70. Beverley, E., Potts, R., Behrensmeyer, A.K., Deocampo, D., Stockhecke, Mona, Rabideaux, N. and Dommain, R., 2016, Identifying and utilizing those pesky paleosols in a lacustrine sequence: examples from the Koora Graben Pleistocene paleolake, Kenya Geo. Soc. Amer. Ann. Mtg., Denver, CO 26-29 Sept., 2016.

The sites selected by the Olorgesailie Drilling Project (ODP) and Hominin Sites and Paleolakes Drilling Project (HSPDP) were targeted for proximity to important archaeological sites in East Africa, which have incomplete paleoenvironmental and paleoclimatic histories. These cores were drilled with the initial expectation of recovering relatively complete lacustrine sections suitable for paleoclimatic reconstructions. However, visual and other analyses have revealed numerous intervals of pedogenic overprinting in almost all cores. Although pedogenesis is a time-averaged paleoenvironmental record, it is important to understand the reason for repetition (and possible cyclicity). Techniques from outcrop studies can be useful for reconstructing paleoclimate from these pedogenic intervals, such as: paleosol drainage class, thickness, horizonation, color, and carbonate development, all of which can be used to calculate soil maturity. Bulk geochemisty of the paleosols indicates degree of weathering, paleoprecipitation, and chemical and physical properties affecting soil fertility. Combining these physical and chemical methods, along with accompanying lithological and paleontological data, in a sequence stratigraphic approach, provides information on climatic or tectonic influences on deposition. Two cores were recovered in 2012 from the Koora Graben, ~20 km southeast of the archaeologically-rich Olorgesailie basin in southern Kenya. These deposits contain fluvial fining upward successions with floodplain paleosols and intervals of pedogenically overprinted lacustrine mud or diatomite. Over 30 individual paleosols have been identified in 216 m of sediment from the two drilling sites. These paleosols are either weakly developed paleo-Entisols or –Inceptisols or moderately developed clay-rich paleo-Vertisols with pedogenic carbonate and vertic features. Preliminary bulk geochemical data indicate that the mean annual precipitation (MAP) ranged from ~750-1000 mm/yr during the episodes of pedogenesis. This MAP estimate is significantly higher than the modern Koora Plain, which ranges from 300-500 mm/yr.