2015 GSA Annual Meeting in Baltimore, Maryland, USA (1-4 November 2015)

Paper No. 136-8
Presentation Time: 9:00 AM-6:30 PM

DEVELOPING TIMESERIES FROM COMPLEX LITHOSTRATIGRAPHIC DRILL CORE RECORDS OF ANCIENT LAKES BEDS IN EAST AFRICA: XRF RECORDS FROM THE OLORGESAILIE DRILL CORES (SOUTHERN KENYA)

STOCKHECKE, Mona, University of Minnesota Duluth, Large Lakes Observatory, 2205 E 5th St, Duluth, MN 55812, POTTS, Richard, Human Origins Program, Smithsonian Institution, National Museum of Natural History, NHB 112, Washington, DC 20560-0112, BROWN, Erik T., Large Lakes Observatory & Dept of Geol. Sci, University of Minnesota Duluth, RLB-109, 10 University Drive, Duluth, MN 55812, BEHRENSMEYER, Anna K., Department of Paleobiology, Smithsonian Institution, National Museum of Natural History, NHB MRC 121, P.O. Box 37012, Washington, DC 20013-7012, DOMMAIN, Rene, Human Origins Program, Smithsonian Institution, Washington, DC 20013, DEINO, Alan, Berkeley Geochronology Center, Berkeley, CA 94709 and COHEN, Andrew S., Department of Geosciences, University of Arizona, Tucson, AZ 85721, mstockhe@d.umn.edu

The influence of high-latitude glacial cycles and precessional or half-precessional forcing on Plio-Pleistocene African climate remains an area of controversy. Outcrops in the Kenyan and Ethiopian rift valleys document repeated occurrences of freshwater lake systems and subarial landscapes over the past 4 million years in regions that are now primarily seasonally dry savanna. Drill cores potentially overcome the limited time resolution of outcrop records and allow characterization of paleoclimate with sufficient precision to examine the role of climate in hominin evolution. In the Olorgesailie Drilling Project, two drill cores were recovered in 2012 in the Olorgesailie/Koora region of southern Kenya. Alternations of lacustrine mud, tephras, paleosols and fluvial deposits accumulated as the drilled area repeatedly flooded and dried. Attempting to resolve continuous records of past environmental conditions at high

resolution, we used the ITRAX XRF core scanner to characterize elemental variability of the sedimentary sequences. Careful data evaluation helped to disentangle primary and secondary signals and to identify unconformities. XRF data from the two drill sites (separated by ~900 m) were compared using lithostratigraphic correlation. Based on detailed lithostratigraphy, which includes smear-slide microscopic analyses and X-radiographic images, we identified sequences corresponding to event deposits and paleosols and developed an event-corrected, adjusted depth scale for the continuous lacustrine sequences, allowing us to create meaningful timeseries from proxy records. Our approach shows that, even within a highly variable lithostratigraphic context, robust and informative paleoclimate timeseries can be established by consistently implementing lithostratigraphic frameworks. In the ~1-Ma Olorgesailie drill core, timeseries of Si/K and Ca intensities, reflecting diatom productivity and calcium carbonate preservation, respectively, fluctuate on orbital as well as millennial timescales.
Session No. 136--Booth# 416

T195. Paleoenvironmental Reconstruction of Hominin Sites: New Methods, New Data, and New Insights (Posters)
Monday, 2 November 2015: 9:00 AM-6:30 PM