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

Paper No. 102-11
Presentation Time: 11:00 AM

USING PHYTOLITHS TO RECONSTRUCT EARLY PLEISTOCENE VEGETATION HISTORY FROM THE HOMININ SITES AND PALEOLAKES DRILLING PROJECT (HSPDP) WEST TURKANA, KENYA, DRILL CORE

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During the summer of 2013, HSPSP researchers recovered a 216-meter long drill core (~2.0-1.4 Ma) from the west side of Lake Turkana, in northern Kenya, which targeted deposits of paleolake Lorenyang, a predecessor of modern Lake Turkana. Lake sediments contain microscopic silica plant remains called phytoliths that are derived from vegetation growing within the watershed of the lake basin. Grasses, sedges, palms and some tropical and semi-tropical trees are prolific producers of phytoliths. Unlike for pollen, phytoliths can be used to resolve grasses to subfamily and even lower taxonomic levels. Thus, phytoliths can be used to differentiate C3 from C4 grasses, and often further subdivide these plant functional types to those that prefer wet (hydrophytic), moist (mesophytic), and dry (xerophytic) conditions. Thus, grass phytoliths can be used to track changes in both the timing (seasonality) and the relative amount of precipitation.

Phytolith counts at 96 cm (~2,400 yr) resolution have recently been completed on the West Turkana drill core. Intervals of pristine phytolith preservation and high phytolith concentrations appear to be correlated with periods of insolation maxima, and may reflect freshwater conditions associated with marsh discharge into paleolake Lorenyang. It may be possible to use these peaks in phytolith concentration as chronological tie points for age model development. Intervals with poor phytolith

preservation or a total loss of biogenic silica due to alkaline porewater conditions appear to be correlated with periods of insolation minima and sequences of dampened insolation maxima. Changes in insolation appear to influence grassland composition, with C4 mesophytic (xerophytic) grass abundance increasing (decreasing) towards summer insolation maxima, as they are likely benefiting from increased summer monsoon precipitation. Transitions from mesic to xeric soil moisture, wooded to more open habitats, and vise versa, appear to have been rapid, and may have had implications on hominin mobility and resource utilization. These results demonstrate that phytoliths provide data that are both novel and complimentary to well established terrestrial vegetation proxies such as pollen and stable isotope analysis, and can fill paleoenvironmental gaps when these proxies are unattainable.

Session No. 102

T195. Paleoenvironmental Reconstruction of Hominin Sites: New Methods, New Data, and New Insights I
Monday, 2 November 2015: 8:00 AM-12:00 PM
Room 324 (Baltimore Convention Center)
Geological Society of America *Abstracts with Programs.* Vol. 47, No. 7, p.287