

The Hominin Sites and Paleolakes Drilling Project (HSPDP): Understanding the paleoenvironmental and paleoclimatic context of human origins through continental drilling

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The influence of climate and environmental history on human evolution is an existential question that continues to be hotly debated, in part because of the paucity of high resolution records collected in close proximity to the key fossil and archaeological evidence. To address this issue and transform the scientific debate, the HSPDP was developed to collect lacustrine sediment drill cores from basins in Kenya and Ethiopia that collectively encompass critical time intervals and locations for Plio-Quaternary human evolution in East Africa. After a 25 month campaign, drilling was completed in November, 2014, with over 2000m of core collected from 11 boreholes from six areas (2160m total drilling length, avg. 92% recovery). The sites, from oldest to youngest, include 1) N. Awash, Ethiopia (~3.5-2.9Ma core interval); 2) Baringo-Tugen Hills, Kenya (~3.3-2.5Ma); 3) West Turkana, Kenya (~1.9-1.4Ma); L. Magadi and Olorgesailie/Koora Plain, Kenya (0.8-0Ma) and the Chew Bahir Basin, Ethiopia (~0.5-0Ma). Initial core description (ICD) and sampling for geochronology, geochemistry and paleoecology studies had been completed by mid2014, with Magadi ICD underway at this writing and Chew Bahir scheduled for ICD work in April 2015. Whereas the primary scientific targets were the lacustrine deposits from the hominin-bearing basin depocenters, many intervals of paleosols (representative of low lake stands and probable arid periods) were also encountered in drill cores. Preliminary analyses of drill core sedimentology and geochemistry show both long-term lake level changes and cyclic variability in lake levels, both of which may be indicative of climatic forcing events of interest to paleoanthropologists.

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