Drilling Project (HSPDP): Collecting palaeolake drill cores from the East African Rift Valley to document the environmental context of human origins

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HSPDP is an international effort involving over 80 scientists from 10 countries, whose aim is to drill long cores from ancient lake beds adjacent to important Plio-Pleistocene fossil hominin and archaeological sites in Kenya and Ethiopia. High resolution geochemical, sedimentological and palaeoecological records obtained from these cores are being used to improve our understanding of the palaeoclimate and palaeoenvironmental setting of important hominin sites, with an ultimate goal of testing models of hominin evolution and demography. Drilling was focused on lacustrine sedimentary sequences to maximize both the temporal resolution of the records from basin depocenters and to increase the number of proxy and indicator records of environmental change that could be interpreted. Five study areas have been drilled with 12 boreholes to date by HSPDP, with a total of ~1580m of core collected (at an average of 95% recovery). Collectively they span many of the critical intervals of hominin evolution in Africa. The Tugen Hills core, collected in the central Kenya rift, spans from about 3.5-2.5Ma, and encompasses a series of precessionally-driven lake cycles. Three cores from the N. Awash basin (Afar region of northern Ethiopia) record both deep and shallow lakes between ~3.5-2.9Ma. One core from the west side of Lake Turkana (northern Kenya) covers a major deep to regressive lake phase between ~2.0-1.45Ma. Lake Magadi, an extant soda lake of southern Kenya, yielded cores from two sites spanning the last ~800ka. The Chew Bahir basin of southern Ethiopia was drilled with a ~42m pilot hole in early 2014, to be followed by two ~400m holes to be drilled in late 2014, which may span the last ~750ka. In addition to analytical studies of the HSPDP cores, an extensive suite of modeling experiments is also underway to better understand the earth system dynamics underlying our palaeoclimatic findings and the implications of these dynamics for human origins.

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