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309-12: STRATIGRAPHIC PACKAGING IN PLIOCENE TO RECENT RIFT LAKE SUCCESSIONS, KENYA RIFT VALLEY, USING LAKE-MARGIN AND TERRESTRIAL ICHNOLOGY

Wednesday, 25 October 2017
11:15 AM - 11:30 AM
Washington State Convention Center - Room 307/308

Trace fossils can help recognize exposure surfaces and to interpret the stratigraphic packaging of rift lake successions. This study includes examples from modern to Pleistocene saline lakes in the Kenya Rift Valley and Plio-Pleistocene subsurface core part of the Hominid Sites and Paleolakes Drilling Program (HSPDP). In the modern lakes, environmental conditions (e.g., salinity), sedimentary processes, sedimentary structures, biogenic structures, and observed trace producers were studied within the zone of frequent lake-level rise-and-fall. Burrow networks, vertical burrows, and pellet-backfilled branching burrows, produced by air-breathing insects, are common in the lake-margin deposits. Terrestrial bioturbation and pedogenesis cross-cut the lake-margin sediments during longer-term exposure, and help to distinguish between short-term lake-level fluctuations and those controlled by longer term allogenic forces. To interpret the stratigraphic packaging in the HSPDP cores, high-resolution (cm-scale) sedimentology and ichnology were used to recognize important exposure horizons. From the cores studied, repeated packages ~3 to ~8 m thick represent lake flooding to exposure cycles, which appear to be controlled by orbital cyclicity. Deeper water facies typically grade into marginal facies, which are then pedogenically modified and bioturbated by terrestrial organisms during periods of lake regression. In order to delineate the stratigraphic surfaces that separate the packages, the recognition of the most landward facies within the packages is essential. However, stratigraphic surfaces are cryptic when basinward facies comprise rooted and bioturbated lake-margin sediments, and when pedogenesis in the landward facies is weak, possibly representing persistently high water tables and/or high groundwater salinity. When present, backfilled terrestrial trace fossils (e.g., termite tunnels) can contain material moved downward several meters, and are especially important for recognizing the cyclical periods of base level drop, and to delineate allogenically controlled stratigraphic packages.

This research is part of the Hominin Sites and Paleolakes Drilling Project and the Olorgesailie Drilling Project, and has benefited from contributions by the HSPDP and ODP teams.

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