

Abstract:

The Lemudong'o Formation in the Narok District of Kenya comprises a 135-m-thick series of predominantly lacustrine and lake basin margin sedimentary rocks with interstratified primary and reworked tuffs. The formation, deposited, 6 Ma, records deposition within the second of three sequential lake basins created by tectonic and volcanic activity on the western margin of the southern Rift Valley of Kenya. These sedimentary paleobasins are exposed in the vicinity of the confluence of three rivers cutting steep cliffs into rugged, vegetated terrain. Over 1200 fossils of terrestrial vertebrates have been recovered from the site of Lemudong'o Locality 1 (LEM 1), which was formed at the edge of a shallow lake fed by slow-moving streams. Much like smaller Rift Valley lake basins in Kenya today, the Lemudong'o lake margin probably supported a mosaic of habitats ranging from closed riparian woodland to grassland and swamps. There are two fossiliferous horizons at LEM 1, clayey sands and gravels and overlying mudstones. Although the mudstones yielded the majority of the fossil material, there are significant faunal differences between the two horizons. The mudstone assemblage consists of taxa whose modern representatives primarily prefer relatively closed environments such as riparian forests, as well as many species that prefer open woodland to wooded grasslands. The sandstone assemblage samples fauna from a wider range of habitats. This contrast in taxonomic composition suggests that the mudstone and sandstone horizons sample a lakeshore environment that was varying through time. The apparent shift in habitat preferences of the fauna is consistent with the geological and geomorphological evidence for a mosaic of closed to open habitats that characterize rapidly variable rift-valley lake basins in mesic climatic regimes. One of the salient characteristics of these assemblages is the complete absence of fish, and the paucity of large mammals and reptiles, such as hippos, crocodiles, and larger bovid species that would be expected at the edge of lake basins fed by large rivers. Modern central rift-valley lake basins that are fed by small streams vary widely in size and salinity in response to climate change, and occasionally dry out completely. They do not contain fish and crocodiles, and only one has a substantial hippo population. These modern rift-valley lakes may therefore provide an analog to the depositional environment of Lemudong'o.