

Diversity and turnover in bovids from the Turkana and Hadar Basins, Kenya and Ethiopia

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After decades of fieldwork, spurred by the search for human ancestors, paleontologists in East Africa are compiling networks of databases to address questions of long term evolutionary responses to climatic change. The author, in collaboration with many colleagues, is analyzing fossil mammals from the Turkana Basin of northern Kenya and southern Ethiopia, and the Hadar basin of Ethiopia's Afar Triangle. The network of databases from Turkana (Omo, Koobi Fora, and West Turkana) and Hadar consists of some 70,000 specimens of fossil vertebrates (mostly mammals) that span from the late Miocene to the middle Pleistocene. Analyses of bovid species turnover, taxonomic abundances, and habitat-indicator species show that significant episodes of faunal change occurred in the latest Miocene, in the Late Pliocene (2.8 million years ago), and again at the Pliocene-Pleistocene boundary (about 1.8 million years ago). Patterns of turnover are linked to step-like environmental changes inferred from bovids that show adaptations to open and seasonally arid environments. Koobi Fora, Omo, and Hadar show an increase in the abundance of arid adapted bovids in the Late Pliocene, suggesting that faunal changes in these different areas are driven by climatic change. West Turkana, however, does not show any significant trends over the same time interval. Thus, although climate appears to be shaping major patterns in the evolution of bovids, the fact that different areas of a single sedimentary basin show distinct responses highlights the complexities involved in establishing causal links between paleoclimate and evolution.