A perspective on Plio-Pleistocene hydrosystems of the northern Turkana Depression (East African Rift System) reconstructed from the study of freshwater mollusk communities

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The northern Turkana Depression of the East African Rift System in Northern Kenya and Southwestern Ethiopia has one of the most complete and well-documented late Cenozoic continental fossil records worldwide, including remarkable finds of early hominins and associated African Cenozoic vertebrates. Most previous paleoenvironmental reconstructions of the depression were developed using terrestrial vertebrate faunas and paleolandscapes, leaving freshwater ecosystems and associated hydrosystems (lakes, tributaries, river deltas, and wetlands) largely unaddressed. African Cenozoic freshwater mollusks were long considered to be good biostratigraphic indicators, given that their communities are able to represent long phases of morphological stability and at other times rapid morphological changes. However, to what extent changes in freshwater mollusk assemblages match with changes in sedimentary landscapes and lake level fluctuations remains unclear. Here, we address this question through integrative studies on Plio-Pleistocene fossil freshwater mollusk assemblages. Specifically, we are developing a taxonomic framework on fossil freshwater bivalves belonging to the families Unionidae, Iridinidae, Etheriidae and Corbiculidae to create a standardized overview of stratigraphically well-characterized fossil assemblages. Subsequently, we integrate this paleontological dataset with sedimentological characterizations of the depositional environments in which shell beds accumulated at high resolution around faunal turnover events. A detailed reconstruction of environmental changes and how these changes affected freshwater ecosystems in the northern Turkana Depression may allow us to recognize key environmental drivers that triggered faunal turnover events. Such an understanding of drivers from the past perhaps provides our best hope to anticipate how future environmental changes will alter freshwater ecosystems in tropical Africa, and, ultimately, the availability of various freshwater resources on which humanity depends.