Quaternary Science Reviews Volume 29, Issues 23–24, November 2010, Pages 2981–2988 Cover image Human evolution in a variable environment: the amplifier lakes of Eastern Africa

Maslin, Mark A; Olaka, Lydia A; Tiedemann, Ralph; Strecker, Manfred R.; Odada, Eric O; Lesoloyia, Moses; Junginger, Annett; Trauth, Martin H; Deino, Alan L

Abstract:

The development of the Cenozoic East African Rift System (EARS) profoundly re-shaped the landscape and significantly increased the amplitude of short-term environmental response to climate variation. In particular, the development of amplifier lakes in rift basins after three million years ago significantly contributed to the exceptional sensitivity of East Africa to climate change compared to elsewhere on the African continent. Amplifier lakes are characterized by tectonically-formed graben morphologies in combination with an extreme contrast between high precipitation in the elevated parts of the catchment and high evaporation in the lake area. Such amplifier lakes respond rapidly to moderate, precessional-forced climate shifts, and as they do so apply dramatic environmental pressure to the biosphere. Rift basins, when either extremely dry or lake-filled, form important barriers for migration, mixing and competition of different populations of animals and hominins. Amplifier lakes link long-term, high-amplitude tectonic processes and short-term environmental fluctuations. East Africa may have become the place where early humans evolved as a consequence of this strong link between different time scales