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Rift-basin compartmentalization and changing environments: tectono-climatic forcing of environmental conditions and species dispersal in the East African Rift System (EARS)

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In the EARS orographic forcing of rainfall, pronounced relief contrasts between shoulder areas and the axial rift sectors results in steep environmental and surface-process gradients, severed fluvial networks, and diverse vegetation types. Due to sustained Quaternary tectono-volcanic activity and the effects of a superposed, highly variable climate these basins have been further differentiated into distinct environments that are either isolated or fluvially connected on time scales of several 10^3 to 10^6 years. The EARS thus comprises important physical corridors, but also barriers with spatially varying topographic conditions and resource distribution. Varying paleo-environmental settings and the present-day distribution of some mammal groups in the EARS' Kenya Rift highlight the importance of rift corridors for the migration of species and the interchange of now geographically isolated lineages.

For example, the presently disjunct distribution of the Bat-eared fox (*Otocyon megalotis*), the Black-backed jackal (*Canis mesomelas*) and the Oryx sister taxa (*Oryx beisa* and *O. gazella*) in northeastern vs. southern Africa, or of various rainforest antelopes such as Bongo (*Tragelaphus eurycerос*) in the Congo basin and beyond the EARS in central Kenya, suggests that variability in connectivity along and across the rift has influenced species dispersal. Protracted rifting dictates the overall geomorphic character of the migration corridors, but fluvial connectivity varies significantly as a response to orbitally driven climatic conditions. These factors were responsible for lateral change in vegetation cover, such as the distribution of wet forests that enabled dispersal in the equatorial sectors of the rift. Such conditions ultimately determined whether the meridionally oriented rift segments acted as gateways or barriers.