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TITLE: Biogeographic responses to geodynamics: A key study all around the Oligo-Miocene Tethyan Seaway

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ABSTRACT:

Extensive terrestrial exchanges were initiated by the closure of the Tethyan Seaway during the Early Miocene. Proboscideans are among the most prominent African immigrants, which arrived in Eurasia about 19 Ma ago via the "Gomphotherium Landbridge". Several distinct waves of continental migrations, however, document that the formation of this landbridge was a multiphase process. Until the closure, a marine faunal exchange was enabled via the Mesopotamian Trough and the Zagros Basin, as reflected by contributions of Indonesian corals in the Iranian basins and by the occurrence of "western" gastropods in Pakistan and India. Nevertheless, the emergence of the landbridge was preceded in the marine biosphere by first biogeographic divergences on both sides of the seaway already during Oligocene times (e.g. within the tridacnines and strombids). Around the closure event, the breakdown of biogeographic relations was near-complete and the Proto-Mediterranean faunas bear little in common with those of the Indo-West Pacific Region (IWPR). Some of the discussed examples suggest that the Western Tethys Region (WTR) had acted as centre of origin and diversity during Oligocene and Early Miocene times. After the closure of the seaway, this centre had shifted to the southeast, heralding the enormous biodiversity of the modern IWPR. Some originally WTR elements managed to follow this shift and formed the Miocene stock for the modern IWPR faunas. In contrast, the marine fauna in the Mediterranean cul-de-sac suffered strong impoverishment due to the Miocene cooling, the Messinian Salinity Crisis and the late Pliocene and Pleistocene glacials ? a fact which might explain the receptivity of the Mediterranean Sea for Lessepsian migrants. This synthesis tries to document the practical problem of recognising biogeographic patterns despite the heterochronous developments in different systematic groups, which, in addition, are often obscured by a stratigraphically incomplete and geographically patchy fossil record.

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