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## Oligocene-Miocene benthos biogeography of the Indian Ocean

**Mathias Harzhauser**, Markus Reuter, and Werner E. Piller

Natural History Museum Vienna, Geological-Paleontological Department, Vienna, Austria (mathias.harzhauser@nhm-wien.ac.at)

With the final closure of the Tethys Seaway during the early Miocene the Indian Ocean came into existence as geographic entity. The total breakdown of faunistic interrelations between the proto-Mediterranean Sea and Indian Ocean during the Aquitanian suggests a major biogeographic separation around ~22 Ma somewhere between Mesopotamia, Arabia, and NW-India. This event predates the development of the so-called Gomphotherium landbridge in the Burdigalian by 4-5 Ma and provides an example for biogeographic separation in the marine realm without formation of a continental barrier. The benthic mollusk fauna of the Miocene Indian Ocean was far from uniform. Data on Oligocene and Miocene mollusks from southern Iran (Qom Basin, Makran), the Sultanate of Oman, Tanzania, northern India (Kutch), southern India (Kerala) and Sri Lanka document a complex pattern of faunistic relations between these areas with high rates of endemism. Thus, a strong early Miocene bioprovincialism can be postulated for the Proto-Indo-West Pacific Region with a Central East African Province, a East African-Arabian Province, a Western Indian Province and a Proto-Indo-Polynesian Province in the east. This pattern differs fundamentally from the modern biogeography in the Indian Ocean. Similarly, fossil reef coral faunas from Eastern Africa (Tanzania, Somalia) show a low relation with southern Iran and no relationship with Indonesia during the Oligocene and early Miocene, but a strong faunistic affinity with Indonesia during the late Miocene and Recent.

We postulate that three main factors explain the strong difference between the Oligocene-Miocene and modern biogeographic patterns: the absence of the Miocene Indian Ocean Equatorial Jet, which did not arise before the middle Miocene, the absence of the Indonesian Throughflow due to the completely different paleogeography, and finally the devastating effect of Pleistocene sea-level fluctuations and subsequent recolonizations of the Indian Ocean from the east.

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