



The evolutionary pathway of the giant clams (Tridacninae) from their Paleogene roots to modern distribution

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Until the closure of the Tethyan seaway during the Early Miocene, an intense marine faunal exchange took place as reflected by contributions of Indonesian corals in the Iranian basins and by the occurrence of “western” gastropods in Pakistan and India. The emergence of the landbridge between Eurasia and Africa was, however, preceded in the marine biosphere by first biogeographic divergences on both sides of the seaway already during Oligocene times, well documented within e.g. strombid gastropods and tridacnine bivalves. Two new tridacnine species were recently discovered from the Chattian and Aquitanian of the Arabian Peninsula (*Omanidacna eos*, *Tridacna evae*). *Omanidacna* is interpreted as an Oligocene ancestor of *Hippopus*, being the oldest record of the tridacnid-lineage. The Aquitanian *Tridacna evae* is the first occurrence of the genus *Tridacna*. These Arabian taxa imply that the modern tridacnine-lineages are rooted in the Paleogene and early Neogene of the Eastern African-Arabian Province, although their Eocene ancestors are Western Tethyan taxa. During the Neogene they successfully settled the Indo-Polynesian Province and became typical elements of the entire Indo-West Pacific Region (IWPR). The tridacnines are thus an example for a successive transformation and gradual eastward migration of an originally Tethyan element contributing to the late Neogene diversity in the Indo-West Pacific. 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 IWPR. Some of well studied 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.