

**Coral species diversity in a modern epeiric sea and open ocean environments: The Java Sea versus eastern Indonesia.**

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Epeiric seas were important marine environments through much of earth history, but are rare today. Elimination of epeiric seas during major regressions has been proposed as a contributing factor in mass extinctions; evaluating this question requires estimating the proportion of marine biodiversity which can be found in epeiric seas. The Java Sea, a modern tropical epeiric sea that was drained during the Pleistocene glaciations, lies near the centre of marine biodiversity for corals, molluscs, fish, and other marine biota. The proportion of total marine biodiversity which can be

found in epeiric seas was estimated by comparing coral species diversity on Java Sea reefs with that on eastern Indonesian reefs in open marine habitats that were not drained during the Pleistocene glaciations. Among reefs not affected by land-based pollution or anthropogenic damage (anchor damage or blast fishing), eastern Indonesian reefs were 20% more diverse than Java Sea reefs. The total species pool found on the Java Sea reefs was 74% that of reefs in eastern Indonesia. 61% of the species recorded were pandemics, occurring in both eastern Indonesia and the Java Sea, 31% were

recorded only in eastern Indonesia, and 8 percent were recorded only in the Java Sea. Rare species and apparent endemics formed a significantly larger proportion of the coral fauna in eastern Indonesia than in the Java Sea. These results partially match published comparisons of Middle Devonian (highstand) rugose coral diversity between the epicontinental Eastern Americas Realm and the open ocean Old World

Realm. The Indonesian data suggest that epeiric seas can host a large fraction of marine biodiversity, but fewer endemic species than open ocean regions. For most marine invertebrates, colonization times into epeiric seas are below the resolution of the fossil record. The epeiric sea marine biodiversity cup is three quarters full, rather than one quarter empty.