On the origins of the coral diversity in Southeast Asia

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Evidences from palaeontological and molecular studies suggest that the formation of the SE Asian ancestral centre of diversity occurred during the Miocene. Under the umbrella of the Throughflow project, delta-front patch reefs from 42 outcrops were studied in East Kalimantan (Indonesia), including extensive collections of tens of thousands of specimens within 265 samples. This research aims to answer how diverse were corals during the Miocene and which environmental factors played a role in their diversification on both, temporal and spatial scales. Coral morphologies seem to respond to the gradient of siliciclastic input created by the Mahakan Delta system. Platy-coral assemblages were common in the vicinity of the delta, characterized by a higher turbid-water regime, and mainly from the Early to Middle Miocene (up to Serravallian age). On the other hand, communities of branching corals mixed with scattered massive coral heads were more frequent during the Late Miocene (Tortonian to Messinian age) in settings located towards the north, far-off the delta influence. Although preliminary (<10% of samples examined), species diversity was high in both platy and branching coral assemblages, and comparable to modern coral settings living under similar environmental conditions. A total of 51 morphospecies (36 genera) have been identified so far, from which only three genera are considered as extinct, *Dictyaraea*, *Anisocoenia*, and *Fungophyllia*. Whether the observed species turnover is due to major global environmental changes after the Middle Miocene, or it is merely explained by switching of the Mahakan Delta gradient, or a combination of both, is an aspect to be examined in further integrated analysis including geochemistry and sedimentology.