

Development of a turbid reef in the Middle Miocene (East Kalimantan, Indonesia)

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Studies on coral communities living in marginal conditions (i.e. low light, high turbidity, extreme temperatures, high nutrients) are important to understand how coral reefs will respond to current global changes. The Kutai Basin (East Kalimantan (Indonesia) contains a rich and well-preserved Miocene fossil record of small patch reefs that developed under the influence of high siliciclastic inputs from the Mahakam Delta. In this study, we reconstruct the paleoenvironments associated with one of these delta-front patch reefs, as an attempt to understand the dynamics of marginal reefs in the past. Stratigraphic logs of two road-cut sections located in the vicinity of Samarinda were measured (each approx. 11 m thick and 20 m wide), and samples were collected to examine the biota assemblages (corals, foraminifers, coralline algae, and bryozoans). Preliminary biostratigraphic analysis suggests a Serravallian age (11–13 My) for this setting. Six sedimentary units were recognized including (1) a siltstone with larger benthic foraminifera (LBF), (2) a coaly shale with small amber chips, (3) a foralgal wackestone with the first appearance of plate, branching and phaceloid corals, (4) a LBF- and coral bioclastic packstone, (5) a plate coral bindstone with abundant bryozoans in a clay-rich matrix, and (6) barren shales. We infer that the development of this patch reef occurred during a relatively rapid transgression, from very shallow environments, to a depth suitable for the development of a platy-coral community. The fossil assemblages could cope with sediment input till abrupt increase in siliciclastic influx led to demise of the reef. Despite the turbid conditions, coral assemblages show a high diversity, including at least 42 genera (63 species). LBF assemblage includes *Lepidosemicyclina polymorpha*, *Nephrolepidina ferreroi*, *Cyclochypus annulatus*, *Operculina* and *Amphistegina*. Coralline algae are dominated by *Neogoniolithon* spp, and few representatives of *Hydrolithon* spp. and *Lithoporella* sp. Fifty-four bryozoan species have been identified, including large encrusting forms growing underneath platy corals and fenestrated colonies found within the sediments. The integration of this data will contribute to our understanding of the structure and function of reefs in turbid settings.