

Fossil coral assemblages of the late middle Pleistocene Minatogawa Formation, southern Okinawa-jima, Japan

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The Minatogawa formation belongs to the so-called “younger limestone” of the Pleistocene reef-complex deposits in the Ryukyu Islands (i.e., Ryukyu Group; <1.45-1.65 Ma), and is composed of limestones younger than 0.4 Ma offlapping the older strata. The deposition of the “younger limestone” marks a major change in depositional style in the Ryukyu Islands, from a subsidence-dominated period characterized by aggradation-retrogradation cycles (>0.4 Ma) to an uplift-dominated period characterized by an offlapping succession of reef limestones (<0.4 Ma). The distribution of the Minatogawa Formation is limited to a few coastal areas in southern Okinawa-jima and nearby small islands. Its thickness does not exceed 20 m, and the main lithologies are coral-rich and well-sorted foraminifera-rich limestones. Our study site is a large quarry that offers the best exposure of the Minatogawa Formation. At this location, the formation is composed of four units (1-4) bounded by subaerial exposure surfaces and resting unconformably on the older Pleistocene reef-complex deposits of the Naha Formation. Outcrops of coral limestones were investigated in the quarry to reconstruct the spatial and temporal variations in coral assemblages. Individual coral colonies were sketched in areas of outcrop 1-2 m in height and up to 10 m in length, and each were identified at the lowest taxonomic level possible. These observations are combined with previously published data on sedimentology and foraminiferal assemblages to investigate the depositional history and paleoenvironmental interpretation of the Minatogawa Formation. Preliminary results indicate that unit 3 displays a succession of three distinct coral assemblages: (1) a pioneer, very shallow (<5 m) *Millepora-Pocillopora* assemblage at the base formed after the rising sea flooded the top surface of unit 2 (detrital limestone), (2) a more diverse, shallow (0-10 m) *Heliopora*-dominated assemblage formed during sea level rise, and finally (3) a merulinid-dominated assemblage which, based on foraminiferal evidence, could be associated with a shallowing as sea level reached a highstand and accommodation space was progressively filled. Future research efforts will focus on expanding the data base on coral taxonomy and distribution in the Minatogawa Formation, and obtaining reliable ages based on nanofossils biostratigraphy and U/Th dating method.

Keywords: fossil coral communities, late middle Pleistocene, environmental and sea level changes, tectonic uplift, Minatogawa Formation, Okinawa-jima