

Changes in coral assemblages in the Great Barrier Reef since the last glaciation

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Drilling into submerged reef structures along the shelf edge of the Great Barrier Reef was carried out during IODP Expedition 325 with the purpose of reconstructing sea level and environmental changes since the Last Glacial Maximum (LGM) and analyzing their impact on reef communities and reef growth. A total of 34 boreholes were drilled between 42 and 167 mbsl at 17 sites along four transects at three geographic locations (Hydrographers Passage, Noggin Pass, and Ribbon Reef). Two basic chronostratigraphic units can be recognized: a last glacial to deglacial reef sequence overlying older Pleistocene reefal and non-reefal deposits. The former varies in thickness from ~5.5 m to ~34 m and consists primarily of coralgall boundstone with various proportions of microbialite. In this study we analyze the variations in coral assemblages since the last glaciation. Exp. 325 cores show that diverse corals, including Faviids, *Acropora*, *Montipora*, and *Porites*, were growing during the last glacial period on the shelf edge. Their distribution was limited to the most distal boreholes during the LGM lowstand. The subsequent deglaciation saw the development of a shallow-water coral assemblage dominated by encrusting to massive *Isopora* and branching *Acropora* and *Seriatopora* as sea level rose. The tops of distal boreholes are marked by a shift to deeper assemblages dominated by encrusting *Porites* and *Montipora* reflecting reef drowning and the formation of submerged reef terraces. As sea level kept rising, a shallow-water *Isopora*-dominated assemblage re-established further upslope and formed a barrier reef before drowning in turn.

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