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Drilling atoll-rim in the North Male Atoll, Maldives: sedimentary structure and Holocene reef development

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We drilled 53.5m into the former reef-crest on the atoll-rim, the North Male Atoll, Maldives. The core site (Male Core-site) is located in a reclaimed land in the southeastern part of Male Island. This study presents Quaternary sedimentary structure and the Holocene reef development in the atoll-rim. The Holocene reef structure and development are also observed at a lagoon reef slope of the northeastern Male Reef where a failure happened and forming an exposure of reef interior.

The Holocene/Pleistocene boundary of Male Core-site is around 9.5m below MSL. On the other hand, the entire reef structure at the lagoon-slope exposure is Holocene down to 25m deep. The pre-Holocene topography in the southern part of the North Male Atoll is higher at the rim and lower beside the lagoon.

More than 40m of Pleistocene reef sequence is observed in this core where four reef units are defined from lithofacies. In each reef unit, coral-algal bindstone accumulated on the top of loose reef sediments which include coral framestone.

In the Holocene reef structure at Male Core-site, coral-algal bindstone forms the uppermost 3.3m below the former reef surface, and reef sediments accumulated below the bindstone. The rigid reef structure is also observed at the upper 2m of the lagoon-slope exposure. AMS ages of the coral/algal samples tell the development of the atoll-rim reef after 8 ka.

Keywords: atoll, drilling core, coral reef development, sedimentary structure, Holocene, Maldives