

Holocene development of high-latitude coral reefs: timing of reef accretion in Satsunan Islands

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The northern limit of the present coral reef with the distinct wave-resistant reef-edge structure lies around 30 degree N in the Ryukyu-Satsunan Islands. We discuss the timing of reef development in the Holocene based on two high-latitude reef complex observed at 30.7 degree N.

Four drilling cores obtained from a coral reef in the northwestern Mage Island by hydraulic drilling machine. The thickness of the Holocene reef is around 2.5m in the reef edge and up to 4m in the back reef. The reef structure shows a distinct zonal litho-facies arranging from the sea to the land: in situ encrusting coral facies, in situ tabular Acropora facies, reworked coral rubble/ reef sand, and terrestrial mud. Based on 12 radiocarbon ages, the reef development started at around 6,500 cal yBP and nearly completed in around 4,500 cal yBP.

We also observed a reef structure at Shojiura, the northeastern Tanegashima by diving into a reef cutting. The maximum thickness of the Holocene reef is 2.8m. The reef consists of a unitary litho-facies of in situ tabular corals. Based on 7 radiocarbon ages, the reef started to grow at around 4,000 cal yBP and completed its formation within 1,500 years.

In both reefs, major reef development ceases less than 2,000 years. The timing of the reef development at Mage Island is coincidental with the Holocene maximum. Meanwhile, the reef development at the northern Tanegashima occurred after the reef formation in Mage Island was terminated. The site-specific reef formation and the narrow time range of reef development may characterize the high-latitude reef growth.