

Reconstruction of the paleoenvironment using *Dipsastraea* coral fossils from Numa coral bed in Tateyama, Chiba

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The Numa coral bed, a marine deposit during the Jomon transgression, is distributed in Tateyama, Chiba Prefecture, where fossil skeletons of more reef-building coral species have been found than those of present-day in the sea around Tateyama. Although the paleo-depositional environment of the Numa coral bed has been discussed using shellfish assemblages or other fossils, there are no research on paleoenvironmental reconstruction using growth parameters and chemical analysis of coral skeletons. This area is the northern limit of reef-building coral habitat on the coast of the Pacific Ocean in Japan. Therefore, to understand the paleoenvironment from the Numa coral bed deposition to the present, allows to examine the developmental history and future environmental changes of the ecosystem with a reef-building coral community at Tateyama. In this study, we aimed to quantitatively reconstruct the paleoenvironment at the time of deposition of the Numa coral bed using the growth parameters and chemical analysis of reef-building coral skeletons collected from Koyatsu area, Tateyama. We measured the coral extension rate, density, and calcification rate of *Dipsastraea pallida*, a reef-building coral commonly found in this area, and compared them with those of *Dipsastraea* from several domestic sites in previous studies. The Sr/Ca and Mg/Ca ratios of the theca wall were determined, and the paleo sea-surface temperature (SST) was reconstructed using the Sr/Ca-SST relationship. Our results show that the average annual extension rate of *Dipsastraea pallida* from Numa coral bed was similar to those of the subtropical *Dipsastraea*, and the density and calcification rate were similar to those in the temperate zone. These results indicate that the habitat of *Dipsastraea pallida* in the Numa coral bed was a temperate reef-building coral community with low wave energy. The reconstructed mean annual SST was about 21.3°C, similar to the present-day Kii Peninsula, and higher than the mean annual SST of about 18.5°C at present-day Tateyama.

Keywords: Coral, skeletal growth parameter, Sr/Ca ratio, Mg/Ca ratio, Numa coral bed