

Estimation of the growth-rate influences on the oxygen isotope and Sr/Ca ratios in the Porites at high latitudes

Shoko Hirabayashi^{1*}, Yusuke Yokoyama¹, Atsushi Suzuki², KAWAKUBO, Yuta¹, Yosuke Miyairi¹, Takashi Okai², NOJIMA, Satoshi³

¹Atmosphere and Ocean Research Institute, The University of Tokyo, ²Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology (AIST), ³Amakusa Marine Biological Laboratory, Kyushu University

The skeletal oxygen isotope in the coral is used as a good proxy to reconstruct sea surface temperature (SST). On the other hand, some studies showed that coral growth rates may affect the oxygen isotope in coral (McConnaughey 1989a; Felis et al., 2003; Suzuki et al., 2005; Hayashi et al., 2013). Here we reanalyzed the same Porites coral in Omata et al. (2006), which was collected in the eastern of Ushibuka in the Amakusa area, Japan, which is located at slightly lower latitude than the northern limit of the hermatypic corals. We measured Sr/Ca ratio and reconstructed SST. Compared to the oxygen isotope ratio measured by Omata et al. (2006), our results showed that Sr/Ca ratio is the robust SST proxy which is independent of its growth rate. We suggest that Sr/Ca ratio is more suitable for reconstruction of SST using the small growth-rate Porites corals, especially in high latitudes.

Keywords: skeletal oxygen isotope in the coral, Sr/Ca ratio, high latitudes, coral growth rates