SEM34-P10 Room:Convention Hall Time:May 24 18:15-19:30

Origin of magnetic remanence in coral skeletons in Ishigaki Island, Japan

KUMAGAI, Yuho[1*] ; NAKAMURA, Norihiro[1] ; SATO, Tetsuro[1]

[1]Department of Earth Science, Tohoku University

Coral skeletons have an attractive potential as high-resolution recorders of the Earth's ancient geomagnetic field for the last several hundreds of years due to their long-lived and annual growth rate, but they have a general problem: 1) the magnetization of corals is very weak and 2) its origin has not been understood. Some of the corals appear to carry an excellent record of the field. Sato et al. (2014) succeeded, even using a conventional spinner magnetometer, to measure enough magnetizations of deceased coral tsunami boulders along the shorelines of Ishigaki Island where the coral reefs are grown on bedrock of Ryukyu limestone and Jurassic schist. Therefore, the in-situ coral skeleton of this Island would provide us a high-resolution paleomagnetic record if we could determine what magnetic minerals and their domain structures. However, our understanding of the magnetic mineral assemblages within coral frameworks is not well developed, because of rare abundance of magnetic particle. Previous rock-magnetic studies have reported two different results of both biogenic magnetite and abiogenic detrital titanomagnetite in late Cenozoic shallow-water carbonate platforms as the main remanence carriers at Bahamas (McNeil et al., 1988) and Tahiti (Ménabréaz et al., 2010), respectively. To determine the remanence carriers for our corals, we conducted petrologic observations of acid-treated residuals of corals by a field-emission type scanning electron microscope (FE-SEM) and revealed the presence of c.a. 80~100 nanometer rectangular-shaped individual iron oxide grains with a very short chain of them, implying the origin of biogenic magnetite. We also found some titanium iron oxides from detrital deposits transported from bedrock schist. A first order reversal curves (FORC) measurements are also conducted to confirm the magnetic mineralogy. FORC diagrams have a narrow ridge along the H_c axis with little vertical spread. The FMR spectra represent a similar form with those of magnetosome-bearing carbonates. Our results indicate that the main magnetic carriers of coral frameworks are from both bacterial and detrital fine-grained magnetite.