Surface layer Nd isotopic composition of Fe-Mn crusts collected from the Takuyo-Daigo Seamount and its relationship with ambient seawater

*Hiroshi Amakawa[1], Akira Usui[2], Koichi Iijima[1], Katsuhiko Suzuki[1]

1. Japan Agency for Marine-Earth Science Technology Research and Development (R&D) Center for Submarine Resources, 2. Marine Core Research Center, Kochi University

Ferromanganese (Fe-Mn) crusts are chemical precipitates that are widely distributed on the ocean floor. As the chemical composition of hydrogenously formed Fe-Mn crusts is believed to directly reflect that of seawater, many researchers have tried to derive chemical compositions of seawater in the past by measuring various radiogenic isotopes, such as Hf, Pb, and Nd, on Fe-Mn crusts. However, the Fe-Mn crust samples used for that purpose were exclusively collected by dredging method, which would not provide the real sampling depths and occurrence of sample. Due to the recent progress of remotely operated vehicle (ROV), we are able to obtain the appropriate Fe-Mn crust samples with real sampling depths by *in-situ* monitoring. Here we report the first record of surface layer Nd isotopic composition of ferromanganese (Fe-Mn) crusts collected by ROV from various water depths (1020–5390 m) along the Takuyo-Daigo Seamount (northwest Pacific), and compare our data with seawater Nd data previously reported at the near by station, TPS 24 27-1 (24˚17.2’ N, 150˚28.2’ E).
The Fe-Mn crust samples were collected during three cruises: *RV Natsushima* NT09-02, *RV Kairei* KR15-E01, and *RV Kairei* KR16-01.
The topmost surface (<1 mm thick) sample was leached with either 2.5 M HCl or 1M HCl with H_2O_2. Nd was separated and purified from the leachate. Subsequently, the Nd isotopic composition was determined with the Neptune Plus housed at JAMSTEC, Yokosuka.
We found that the depth profile of ferromanganese crusts is similar to the vertical seawater profile reported for TPS 24 271-1 station. This fact indicates the surface layers of the Fe-Mn crust reliably reflect seawater values. We also found that our epsilon Nd surface layer profile is consistent with previously reported data for the northern Pacific Ocean. This implies that the seawater Nd isotopic distribution in the northwest to central Pacific is horizontally fairly homogenous below 1000 m and might have been so for about 0.1 to 0.2 Ma.

Keywords: ferromanganese (Fe-Mn) crust, Nd isotopic composition, seawater, Takuyo-Daigo Seamount, remotely operated vehicle (ROV)

©2017. Japan Geoscience Union. All Right Reserved.