

Origin of ferromanganese nodules in the Minamitorishima EEZ

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Ferromanganese nodules are spherical material widely distributed on the deep seafloor. The nodules are mainly composed of Fe-Mn-(oxyhydr)oxides and are also enriched in critical metals such as Co and Ni. Thus, they are expected as a potential resource for the elements [1]. In 2010, a dense field of ferromanganese nodules was discovered for the first time on a seamount within the Japanese Exclusive Economic Zone (EEZ), approximately 300 km east of Minamitorishima Island [2]. Furthermore, in 2016, several areas where ferromanganese nodules were densely distributed have also been recognized in the eastern to southeastern part of the Minamitorishima EEZ [3].

In order to explore the promising areas for the future development of the nodules, it is necessary to elucidate their origin. It has long been suggested that large-scale distribution of ferromanganese nodules is coincide with flow channel of deep-sea current [4, 5]. However, origin and its relation to distribution of ferromanganese nodules remain uncertain.

Here, we focus on nuclei of ferromanganese nodules due to the fact that ferromanganese nodules start to grow around nuclei. Characterizing the nuclei of the nodules can, thus, provide important information on the growth initiation of the nodules. In this study, X-ray CT, XRF mapping, and ICP-MS analyses of the nuclei of ferromanganese nodules were performed. The results show that significant part of the nuclei of ferromanganese nodules are derived from seamounts. In the presentation, we will discuss the origin of the nuclei of ferromanganese nodules in the Minamitorishima EEZ and its relation to the growth initiation and distribution of the nodules.

References:

- [1] Hein et al. (2013) Ore Geology Reviews, 51, 1–14.
- [2] Machida et al. (2016) Geochemical Journal, 50, 539–555.
- [3] JAMSTEC press release, August 26, 2016.
- [4] Goodell et al. (1971) Antarctic Res. Ser., 15, 27–92.
- [5] Kennett and Watkins (1975) Science, 118, 1011–1013.

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