

Resource potential of REY-rich mud in the Japanese Exclusive Economic Zone (EEZ) around Minamitorishima Island

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Rare-earth elements and yttrium (REY) are essential for various high-tech devices and green technologies including electric vehicles, fiber optics, smart phones, wind power generation etc. Recently, the deep-sea sediments enriched in REY (termed as "REY-rich mud") have been discovered in the Pacific Ocean, which has the great potential as a completely new REY resource (Kato et al., 2011). Following the discovery of REY-rich mud in the Pacific Ocean, the presence of REY-rich mud was also confirmed in the cores drilled by Deep Sea Drilling Project (DSDP) /Ocean Drilling Program (ODP) in the Japanese Exclusive Economic Zone (EEZ) around Minamitorishima Island (Kato et al., 2012). The discovery of REY-rich mud in the Japanese EEZ is of essential importance because it allows us to exploit the new resource for REY on our own way.

In order to obtain a detailed knowledge of the distribution of REY-rich mud in the Minamitorishima EEZ, four research cruises (KR13-02, MR13-E02 Leg 2, KR14-02, and MR14-E02) have been conducted from 2013 to 2014. As a result, the presence of "extremely REY-rich mud" (that shows total REY content higher than 5,000 ppm) has been confirmed in the southern area of the Minamitorishima EEZ (Kato et al., 2013; Fujinaga et al., 2013; Suzuki et al., 2013). The extremely REY-rich mud layers can be found at the depths shallower than 10 meters below the seafloor, which should be favorable to development of this REY resource.

In this study, assuming the southern area of the Minamitorishima EEZ as the most promising area for the exploitation in the near future, we evaluate the resource potential of the REY-rich mud, including the extremely REY-rich mud layers, in this area.

Keywords: Minamitorishima EEZ, REY-rich mud, extremely REY-rich mud layers, deep-sea mineral resources, resource potential