

Chemostratigraphic correlation of REY-rich mud cores in the western North Pacific Ocean

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Recently, deep-sea sediments containing over 5,000 ppm of rare-earth elements and yttrium (REY), termed “extremely REY-rich mud”, were discovered within the Japanese exclusive economic zone (EEZ) around Minamitorishima island in the western North Pacific Ocean [1]. Because of its remarkable REY concentration [1] and widespread distribution [2], REY-rich mud has been stimulating interest strongly as a new and promising seafloor mineral resource. However, previous studies showed that the number, occurrence depth and maximum content value of the REY-enriched layers are variable even in the limited area of the Minamitorishima EEZ [3]. This hampers clarifying the factors that control the formation and distribution of the extremely REY-rich mud.

To solve the conundrum, we focus on bulk chemical compositions of the sediments. Multi-elemental data structures composed of the samples from over 50 piston cores collected from the Minamitorishima EEZ, exhibit distinctive features. Based on the geochemical features, we classified the sediments into nine types that correspond to their stratigraphic positions within a sediment column, including three distinct REY-enriched layers. The chemostratigraphy suggests that deposition of extremely REY-rich mud occurred at least three times, and reveals that the formation of REY-enriched layers were closely related to erosion events on the deep-sea floor.

[1] Iijima et al. (2016) *Geochemical Journal* 50, 557-573.

[2] Kato et al. (2011) *Nature Geoscience* 4, 535-539.

[3] Takaya et al. (2018) *Scientific Reports* 8, 5763.