

Geochemical independent components constituting deep-sea sediments within the Minamitorishima EEZ

*Kazutaka Yasukawa^{1,2}, Kentaro Nakamura¹, Koichiro Fujinaga^{2,1}, Junichiro Ohta^{3,1}, Hikaru Iwamori^{3,4}, Yasuhiro Kato^{1,2,3}

1.School of Engineering, The University of Tokyo, 2.Chiba Institute of Technology, 3.JAMSTEC, 4.Department of Earth and Planetary Sciences, Tokyo Institute of Technology

Recently, the presence of "extremely REY-rich mud", deep-sea sediments containing extraordinarily high concentrations of rare-earth elements and yttrium (REY), was confirmed within the Japanese exclusive economic zone (EEZ) surrounding Minamitorishima Island (Kato et al., 2013; Fujinaga et al., 2013; Iijima et al., submitted). The maximum total REY content in the extremely REY-rich mud exceeds 7000 ppm, which is higher than that of any other deep-sea sediment ever reported from the world ocean.

Deciphering the genesis of the mud should provide us groundbreaking insights into both the potential distribution of the novel resource for REY of great economic value and the mystery of paleoceanographic event(s) that caused an anomalous concentration of specific elements in an abyss. As a first step to achieve the goal, it is quite important to unravel the source materials and physicochemical processes that generated the sedimentary sequence.

Here we applied Independent Component Analysis to the comprehensive data set composed of major- and trace-elemental contents of more than 800 bulk deep-sea sediment samples collected from the Minamitorishima EEZ. Although being a preliminary interpretation, several geochemical independent components can be extracted from the whole data structure; e.g., biogenic calcium phosphate associating with very high REY content, Fe-Mn oxides accompanied by characteristic metals, etc. We report the results and interpretation of our new analysis, and statistically characterize the deep-sea sediments within the Minamitorishima EEZ.

-- References --

Fujinaga, K. et al. (2013) *JpGU Meeting 2013*.

Kato, Y. et al. (2013) *JpGU Meeting 2013*.

Keywords: deep-sea sediment, REY-rich mud, Independent Component Analysis