Genesis and distribution of rare-earth elements and yttrium-rich mud in the South Pacific Ocean

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In 2011, Kato et al. [1] reported the potential of deep-sea sediment containing high concentrations of rare-earth elements and yttrium (REY-rich mud) in the Pacific Ocean as a new source for REY. It has been demonstrated that the REY-rich mud are distributed mainly in two regions: the eastern South Pacific and central North Pacific. In the North Pacific Ocean, REY-rich mud has also been discovered within the Japanese exclusive economic zone (EEZ) around Minamitorishima island [2]. Subsequently, detailed geochemical study on the REY-rich mud in the North Pacific Ocean proceeded rapidly, clarifying its distribution, stratigraphic position, and structural components including the host phases of REY [3, 4]. In striking contrast to the substantial progress in the North Pacific Ocean, REY-rich muds in the South Pacific Ocean has still not been well understood, even though their high Σ REY concentrations (> 2000 ppm) [1]. This is, at least in part, due to the lack of sediment cores recovered from the South Pacific Ocean (especially southern part of the South Pacific Ocean). IODP cores recovered by Exp. 329 [5] can provide a unique opportunity to elucidate genesis and distribution of REY-rich mud in the South Pacific Ocean.

In this study, we present the results of geochemical analysis of sediment samples obtained from the IODP Exp. 329 cores and discuss the distribution, stratigraphic position, and constituting components of the South Pacific Ocean REY-rich mud. We also compare our results with those in the North Pacific Ocean.

References : [1] Kato et al. (2011) Nature Geoscience 4, 535-539. [2] lijima et al. (2016) Geochemical Journal 50, 557-573. [3] Nakamura et al. (2016) JpGU Abstract. [4] Mimura et al. (2017) JpGU Abstract. [5] D' Hondt et al. (2011) Proc. IODP, vol. 329.

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