

Origin of deep-sea sediments within the Minamitorishima EEZ based on downhole variation of bulk chemical composition and isotopic ratios

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Recently, deep-sea sediments containing a high concentration of rare-earth elements and yttrium (REY), which is called “REY-rich mud”, were discovered in the Pacific Ocean [1]. Moreover, the presence of “extremely REY-rich mud” was confirmed within the Japanese exclusive economic zone (EEZ) surrounding Minamitorishima Island [2]. Although previous studies have shown that the main host phase of REY in these sediments is biogenic calcium phosphate based on bulk and *in situ* geochemical analyses [2,3], the contribution of other components constituting the REY-rich mud have not been completely understood yet.

One of the most effective ways to constrain the origin(s) of the deep-sea sediments, including REY-rich mud, is to use isotopic ratios of the sediments, because each possible geochemical end-member has characteristic isotopic ratios reflecting source materials and genetic processes [4].

Here, to clarify the origin of deep-sea sediments within the Minamitorishima EEZ, we modeled and quantified the contribution ratios of a few, representative geochemical end-members based on Sr isotopic ratio and major-/trace-element contents. The reconstructed downhole variation of the contribution ratios indicates a transition of end-members along with the change of geological settings due to the motion of the Pacific plate.

References

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