

Extended lateral correlation of deep-sea sediments around the Minamitorishima EEZ based on downhole variation of bulk chemical composition

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Deep-sea sediments extremely enriched in rare-earth elements and yttrium (REY), showing up to 8,000 ppm of total REY concentration (Σ REY), exist within the Japanese exclusive economic zone (EEZ) near Minamitorishima Island in the western North Pacific Ocean [1, 2]. These deposits have stimulated interest as a new and highly promising mineral resource for REY. However, the number, occurrence depth and maximum Σ REY content of these REY-enriched layers appear to be quite variable, which makes it difficult to directly compare REY content peaks in different cores, and to investigate the geological factors controlling their formation and distribution.

Based on a careful consideration of a large geochemical dataset, we have recently recognized that deep-sea sediments within the Minamitorishima EEZ can be divided into nine types of stratigraphic layers, including three distinct REY peaks, with characteristic chemical compositions [3]. These layers deposited in a specific sequence and have lateral continuity in the Minamitorishima EEZ [3], which enables us to correlate the REY peaks in different cores.

In this study, we newly applied the chemostratigraphy to the piston core samples around the Minamitorishima EEZ collected by the MR16-07 cruise. The multi-elemental analysis suggests that the chemostratigraphy spreads out of the Minamitorishima EEZ and reaches at least ~500 km southeast of Minamitorishima Island.

References

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