A chemostratigraphic correlation of pelagic clay in the North Pacific Ocean

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Deep-sea sediment is an important medium recording changes of atmospheric/oceanic circulations and surface ocean productivity in a geologic time scale [1,2,3]. Pelagic clay is one of the common types of deep-sea sediments depositing at remote areas in the ocean with a considerably low sedimentation rate. Despite the importance of the pelagic clay as a recorder of ocean environmental changes, less attention has been paid to this type of sediment probably due to lacks of visible features and microfossils to determine depositional age. Therefore, a significant information gap still remains to understand an entire picture of the pelagic sediment stratigraphy in a basin-wide scale, which in turn hampers elucidation of long-term global environmental changes. To clarify the stratigraphy, high-resolution chemical analyses of long and fully recovered sediment cores are needed. Here, we focused on cores from ODP Sites 1149 and 1179 in the western North Pacific Ocean, both of which are recovered continuously from the seafloor surface to basement chert.

In this study, we determine the bulk chemical compositions of pelagic clay samples with ~50 cm intervals from the two ODP Sites. Bulk geochemical feature of GPC3-LL44 [4] is also refered as a representative of deep-sea sediments in the central North Pacific Ocean. Our results, including P_2O_5/Co ratios and REE compositions, clearly show a common chemostratigraphy among these three cores covering a broad area of the North Pacific Ocean. Moreover, we quantified the relative contributions of envisaged geochemical end-members causing the compositional variations in the pelagic clay. On the basis of the results, we discuss the spatiotemporal variations of material supplies and sedimentary environments in a pelagic area of the North Pacific Ocean.

References

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