

Origin of common chemostratigraphy of pelagic clay in the North Pacific Ocean: age constraints from ichthyolith stratigraphy

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Pelagic clay, a common type of seafloor sediment [1], is an important medium recording changes of atmospheric/oceanic circulations and surface ocean productivity on a geologic time scale. Despite its importance, however, less attention has been paid to the pelagic clay probably due to a lack of visible features and absence of siliceous/calcareous microfossils indicating depositional ages. Therefore, an entire picture of pelagic clay stratigraphy is not fully understood, which in turn hampers an elucidation of long-term global environmental changes recorded by the deep-sea sediments.

Recently, we determined bulk chemical composition of deep-sea sediments, including pelagic clay with high sampling resolution, obtained from ODP Sites 1149 and 1179 in the western North Pacific Ocean [2,3]. We confirmed that pelagic clay in both sites had a common chemostratigraphy characterized by several major and trace elements, suggesting that depositional environments had changed during their deposition. Moreover, we compared the bulk chemical compositions of the pelagic clay in the western North Pacific and that of the previously reported LL44-GPC3 in the central North Pacific [4]. The result suggested that the common chemostratigraphy could be extended to the whole area of the North Pacific Ocean [5].

The common chemostratigraphy suggests that pelagic clay in the North Pacific Ocean have experienced similar environmental changes. There are two possible causes of the common chemostratigraphy (i.e., changes in depositional environments): temporal changes in global climate or shifts in depositional positions of each site driven by the motion of the Pacific plate. To clarify the cause of the chemostratigraphy, depositional age of each sediment layer provides a crucially important constraint. However, the depositional age of pelagic clay in ODP Sites 1149 and 1179 have been remained uncertain.

In this study, we constrained the depositional ages of pelagic clay at ODP Sites 1149 and 1179 based on the stratigraphy of ichthyoliths (microfossils of fish teeth and dermal denticles). In our presentation, we discuss the origin of the common chemostratigraphy in the North Pacific Ocean based on our new age constraints.

References

- [1] Dutkiewicz et al. (2015) *Geology* **43**, 795-798.
- [2] Mimura, K et al. (2016) *JpGU Meeting 2016*.
- [3] Yamamoto, K et al. (2017) *JpGU Meetig 2017*.
- [4] Kyte et al. (1993) *Geochimica et Cosmochimica Acta* **57**, 1719-1740.
- [5] Mimura, K et al. (2017) *JpGU Meeting 2017*.

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