

Chemostratigraphy and depositional ages of pelagic clay in the North Pacific Ocean: Implications for the origin of REY-rich mud

KAZUHIDE MIMURA¹, KATSUSHI YAMAMOTO¹,
KENTARO NAKAMURA¹, KAZUTAKA YASUKAWA^{1,2},
JUNICHIRO OHTA², KOICHIRO FUJINAGA^{2,1}, SHIKI
MACHIDA^{2,3}, YASUHIRO KATO^{1,2,3*}

¹The University of Tokyo, Tokyo, 113-8656, Japan

(*Correspondence: ykato@sys.t.u-tokyo.ac.jp)

²Chiba Institute of Technology, Chiba, 275-0016, Japan

³Japan Agency for Marine-Earth Science and Technology,
Yokosuka, Kanagawa, 237-0061, Japan

Pelagic clay, a common type of seafloor sediment, is an important medium recording various environmental changes on a geologic time scale, especially from the late Cretaceous to the present day. In addition, pelagic clay in some areas of the Pacific Ocean contains higher contents of rare-earth elements and yttrium (REY) than those of the onshore ion-absorption-type ore deposits [1]. This type of pelagic clay, termed as REY-rich mud, has been expected as a new type of deep-sea mineral resource for the industrially essential metals [1]. However, less attention has been paid to this type of sediment than the other type sediments, probably due to a lack of visible features and an absence of siliceous/calcareous microfossils indicating depositional ages.

Recently, we determined bulk chemical compositions of pelagic clay obtained from ODP Sites 1149 and 1179 in the western North Pacific Ocean [2]. By comparing them with those of LL44-GPC3 [3] in the central North Pacific Ocean, we confirmed that pelagic clay, including REY-rich mud, in the North Pacific Ocean has a common chemostratigraphy characterized by several major and trace elements [2].

The common chemostratigraphy can provide important insights for both exploring the resource in the present seafloor and elucidating past environmental changes recorded in the pelagic clay. However, depositional ages of pelagic clay in ODP Sites 1149 and 1179 remain uncertain. In this study, we constrained the depositional ages of pelagic clay in both sites based on the stratigraphy of ichthyoliths (microfossils of fish teeth). Based on our new age constraints, we discuss the origin of the common chemostratigraphy and REY-rich mud in the North Pacific Ocean.

References: [1] Kato et al. (2011) *Nat. Geosci.* **4**, 535-539.
[2] Mimura, K et al. (2017) *Goldschmidt 2017*. [3] Kyte et al. (1993) *Geochim. Cosmochim. Acta* **57**, 1719-1740.