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# Assessing the Reliability of Bioapatite U–Pb Dating in Pelagic Clay: A Case Study from western North Pacific Ocean

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Pelagic clay covers approximately 38% of the ocean floor and archives secular changes in distal and deep ocean regions [1]. Constructing an accurate age model is essential for fully utilizing this record. However, the accurate age determination of pelagic clay remains challenging due to the absence of typical index fossils (e.g., foraminifera or radiolarians), thereby limiting high-resolution paleoceanographic studies.

U–Pb dating of biogenic apatite (e.g., fish teeth) has been proposed as a novel approach for determining sedimentation ages in pelagic clay [2]. This method holds promise for constructing a robust age model of pelagic clay. However, the behavior of trace elements, including U and Pb, in biogenic apatite contained in pelagic clay remains poorly understood, and it is still unclear whether it can serve as a reliable geochronological proxy.

Here, we evaluate the applicability of U–Pb dating of bioapatite from pelagic clay to determine its potential for establishing an age model of the sediment. The study area exhibits a uniform chemostratigraphy across a 200 km-wide sampling region [3], indicating a low likelihood of allochthonous sediment input. Consequently, the sedimentary sequence is expected to follow a consistent stratigraphic order, with younger deposits at the top and older ones at the bottom, making this site well suited for assessing the reliability of U–Pb dating of bioapatite. In the presentation, we show the results of U–Pb dating and chemical imaging analyses conducted using laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) on approximately 100 bioapatite samples collected from multiple stratigraphic horizons in a pelagic clay core obtained from the western North Pacific Ocean near Minamitorishima, an isolated island approximately 1,800 km southeast of Tokyo, Japan. Additionally, we discuss a sample screening approach to enhance the robustness of U–Pb dating in pelagic clay based on sample characteristics such as chemical distribution or crystallinity.

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[3] Tanaka et al. (2020), *Ore Geol. Rev.* **119**, 103392