

Age and origin of Philippine Sea basins -Tectonic setting leading to subduction initiation-

OSAMU ISHIZUKA^{1,2}, KENICHIRO TANI³, REX N TAYLOR⁴, SUSUMU UMINO⁵, IZUMI SAKAMOTO⁶, YUKA YOKOYAMA⁶, GEN SHIMODA⁷, YUMIKO HARIGANE⁷, YASUHIKO OHARA^{8,9,10}, CHRIS CONWAY¹ AND AMERICUS PEREZ¹¹

¹Geological Survey of Japan

²Geological Survey of Japan/AIST

³National Museum of Nature and Science

⁴University of Southampton

⁵Kanazawa University

⁶Tokai University

⁷Geological Survey of Japan, AIST

⁸Hydrographic and Oceanographic Department of Japan

⁹JAMSTEC

¹⁰Nagoya University

¹¹Philippine Nuclear Research Institute

Presenting Author: o-ishizuka@aist.go.jp

Recovery and characterization of igneous crust of the oldest parts of the Philippine Sea Plate provide crucial information about the tectonic setting during onset of Pacific Plate subduction along the Philippine Sea Plate margin and establishment of the Izu-Bonin-Mariana arc, which allows testing of hypotheses for subduction initiation along the Western Pacific margin.

Eocene andesitic magmatism (Northern Philippine Sea volcanics) has been discovered in and around the Kita-Daito Basin[1]. Ar/Ar and zircon U-Pb dating results of these igneous rocks indicate that this magmatism occurred mainly between 45 and 42 Ma. Geochemical characteristics of these andesites indicate slab-derived material contributed to their source. However, the lack of any systematic spatial variation of the slab component in the Northern Philippine Sea volcanics, as well as their great distance (over 400 km) from the arc led us to argue that this magmatism was not associated with on-going subduction, but was instead related to the rifting event that formed the Kita-Daito Basin. As activity of the Northern Philippine Sea volcanics was essentially synchronous with the magmatism associated with the Oki-Daito mantle plume, it is possible that both magmatism and rifting of the Kita-Daito Basin were triggered by the arrival of the Oki-Daito mantle plume in this region. These results demonstrate that the Kita-Daito Basin postdates subduction initiation of the Pacific Plate along the Izu-Bonin-Mariana arc.

We will present geochronological and geochemical data of igneous rocks from the oldest part of the West Philippine Basin as well as the Palau Basin, which constitute the oldest part of ocean crust of the Philippine Sea Plate. The basalts collected from the ocean crust of these basins show enriched geochemical characteristics implying contribution of similar mantle component observed in the Oki-Daito plume. Its implication to

the tectonics in the very early stage of the Philippine Sea Plate will be discussed.

[1]Ishizuka, Tani, Taylor, Umino, Sakamoto, Yokoyama, Shimoda, Harigane, Ohara, Conway, Perez & Sekimoto (2022), *Geochem. Geophys. Geosyst.* 23, e2021GC010242.