$\Delta^{14}C$ variability obtained from high-resolution radiocarbon measurements in coral skeletons from the western Pacific

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Corals skeletons consistent with calcium carbonate and are widely used as archives of paleoenvironments such as sea surface temperature reconstruction. Radiocarbon (14 C) in coral skeletons is used as a tracer of ocean circulation because corals take dissolved inorganic carbon (DIC) of seawater in their skeletons. Sample size requirement for conventional 14 C measurement, however, need more than 10 mg of CaCO₃ (1 mgC), which prevent us to establish a history of high-resolution seawater properties.

In this study, we established a new ¹⁴C analytical method, which requires smaller amount of carbonate samples using the accelerator mass spectrometry (AMS) at the Atmosphere and Ocean Research Institute, The University of Tokyo (YS-AMS). Coral skeletons along the Kuroshio trajectory were used to understand the variations of Kuroshio, which were compared with published radiocarbon ratio (Δ^{14} C) data in the western Pacific.

Our results showed that Δ^{14} C in Luzon, Ishigaki and Kikai Is, along Kuroshio current, were similar after 1950 (Post-bomb period). Before 1950 (Pre-Bomb period), our data showed that Δ^{14} C in 1940s were different from Δ^{14} C in 1900s previously reported by Yoneda et al. (2007). It is suggested that sea surface Δ^{14} C fluctuates during a short period of time in the western Pacific. This variability would influence significantly to the calibration of local marine reservoir effects when calibrating ¹⁴C ages to calendar ages.

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