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

*Shoko Hirabayashi[1,2], Yusuke Yokoyama[1,2], Atsushi Suzuki[3], Yosuke Miyairi[1], Takahiro AZE[1]

1.Atmosphere and Ocean Research Institute, The University of Tokyo, 2.Graduate School of Science, The University of Tokyo, 3.Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology (AIST)

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 $CaCO_3$ (1 mgC), which prevent us to establish a history of high-resolution seawater properties.
In this study, we established a new ^{14}C 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 ($\Delta^{14}C$) data in the western Pacific.
Our results showed that $\Delta^{14}C$ 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 $\Delta^{14}C$ in 1940s were different from $\Delta^{14}C$ in 1900s previously reported by Yoneda et al. (2007). It is suggested that sea surface $\Delta^{14}C$ 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 ^{14}C ages to calendar ages.

Keywords: Radiocarbon, Δ14C variability, ΔR, coral, sea surface water

