

## Pacific Ocean current variations recorded as high-resolution bomb radiocarbon in the western Pacific corals

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High-resolution measurements of radiocarbon ( $^{14}\text{C}$ ) in corals can be used to reconstruct past variability in ocean conditions. However, the conventional  $^{14}\text{C}$  measurement requires more than 10 mg of carbonate samples even for Accelerator Mass Spectrometry (AMS), which prevent us to establish a history of high-resolution seawater properties.

We established a new  $^{14}\text{C}$  analytical method, which requires smaller amount of carbonates using AMS at the Atmosphere and Ocean Research Institute, The University of Tokyo. Using our new method, we report seasonal  $\Delta^{14}\text{C}$  changes in coral from Ishigaki Island and compare with previously reported data from Palau and Guam. Our data clearly indicate a significant increase in  $\Delta^{14}\text{C}$  from 1947 to 1998 related to atmospheric nuclear bomb testing. Additionally, the existence of three early  $\Delta^{14}\text{C}$  spikes of nuclear bomb tests in 1950s was confirmed in the North Pacific western boundary current area. After 1976, variability in the Mindanao Dome region related to North Equatorial Current bifurcation latitude migration affected the  $\Delta^{14}\text{C}$  difference between Palau and Guam, whereas difference between Ishigaki and Guam was not correlated with the bifurcation latitude. The  $\Delta^{14}\text{C}$  difference between Ishigaki and Guam may be owing to mesoscale eddies in the Kuroshio area. On decadal scale, evidence suggests that stronger transport by the Kuroshio around the Luzon Strait resulted in less upwelling, which may be represented by a smaller  $\Delta^{14}\text{C}$  difference between Ishigaki and Guam after 1976.

Keywords: Radiocarbon, Corals, Western Pacific, north Pacific western boundary current