

Trends and seasonal cycle of atmospheric radiocarbon in carbon dioxide observed at Hateruma Island

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We have been conducted monthly air samplings for measurements of atmospheric radiocarbon in carbon dioxide ($^{14}\text{CO}_2$) at Hateruma Island (HAT, 24.05N, 123.80E, 47 m a.s.l.), Japan since 2004. We collected whole air samples using 2.0L glass flasks pressurized to 3 atm, and 5L air was used for radiocarbon analysis. The values of Delta14C were measured using compact Carbon Accelerator Mass Spectrometry (CAMS, NEC 1.5SDH). Uncertainty in Delta14C measured by CAMS is less than 2 per mil, which is based on the number of ^{14}C counts and the scatter of $^{14}\text{C}/^{12}\text{C}$ ratios during measurements. The reproducibility of CAMS measurements is ± 1.4 per mil (standard deviation of Delta14C values in a reference air cylinder).

Here we show the Delta14C values of background maritime air observed at HAT from 2004 to 2012. The seasonal cycle of Delta14C was observed: minimum in winter-spring and maximum in summer, with amplitude of 10 per mil. Decreasing trends in Delta14C were from -5 to -6 per mil/year, however, higher growth rates (less decreasing trends) of -2 per mil/year were observed in 2008-2009. The reason for the IAV in Delta14C will be discussed.

Keywords: carbon cycle, carbon isotope measurements, accelerator mass spectrometry