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Deep-water ventilation changes in the mid-latitudinal NW Pacific since the last glacial period

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We present ventilation change in the mid-latitudinal NW Pacific off Kashima since the last glacial period based on coexisting planktic and benthic foraminifer radiocarbon measurements of MD01-2 420 core (36.07 degree N, 141.82 degree E, water depth: 2101 m). During the early phase of the termination between 17.5 and 15 kyr B.P., the radionuclide ^{231}Pa to ^{230}Th ratio in northern Atlantic sediments suggest shutdown of the Atlantic Meridional Overturning Circulation (AMOC) triggered by a massive discharge of fresh water to the North Atlantic (Heinrich Event 1; H1). Because of 190 per mil drop of ^{14}C to ^{12}C ratio in the atmosphere and atmospheric CO_2rise by 40 ppm during H1, renewal of isolated carbon reservoir in deep water is thought to be linked to reorganizations in AMOC. Deep water has a large capability to store carbon as 50 times as large as the atmosphere and Pacific Ocean is volumetrically most important. Although paleoproxy studies argued Pacific intermediate and deep water ventilation changes during the last termination, there is no comprehensive agreement during H1, i.e., (1) enhanced ventilation in mid-depth of northwestern North Pacific (Ahagon et al., 2003; Sagawa and Ikehara, 2008); very old intermediate water in the eastern tropical Pacific (Marchitto et al., 2007; Stott et al., 2009); and no significant changes in deep water (2000-2800 m) in the western tropical Pacific (Broecker et al., 2 004; 2009). Because there is no mid-latitudinal ventilation records in the western North Pacific, our new records may hold important clues towards understanding ocean circulation during the last termination.

Keywords: Ventilation, Termination I, Thermohaline circulation, Mystery Interval