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

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We present detailed ventilation records in the mid-latitudinal NW Pacific off Kashima since the last glacial period based on coexisting planktic and benthic foraminifer radiocarbon measurements of MD01-2420 core (36 degree 04 min. N, 141 degree 49 min. E; water depth: 2101 m). During the early phase of the termination between 17.5 and 15 kyr B.P., the radionuclide {sup}231{/sup}Pa to {sup}230{/sup}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 {sup}14{/sup}C to {sup}12{/sup}C ratio in the atmosphere and atmospheric carbon dioxide rise 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.

Our recent study suggests that deepwater was formed in the North Pacific extending to a depth of ˜2500 m during H1, with the establishment of a deep Pacific Meridional Overturning Circulation (PMOC). The main simulated pathway of deepwater spreading is along the western margin of the North Pacific, in a deep western boundary current analogous to the one currently in the North Atlantic. However, ventilation records are still limited and we need more records particularly in deepwater below 2000 m. MD01-2420 core is an ideal sample for reconstructing past ventilation changes because of its high sedimentation rates (˜25 cm/kyr) and good preservation of CaCO{sub}3{/sub}. We would like to discuss perspective toward an understanding the role of the North Pacific in global ocean circulation and carbon cycle.

Keywords: ocean circulation, ventilation, North Pacific, last glacial period, Heinrich event 1