Ventilation history in North Pacific intermediate water during the deglacial and glacial warming periods

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Mechanism for abrupt atmospheric carbon dioxide increase during the deglaciation associated with global overturning circulation remains uncertain. Uncertainty remains in mechanisms of changing global overturning circulation that may have contributed to the abrupt deglacial increase in atmospheric carbon dioxide. Many recent explanations call on greater carbon storage in a poorly ventilated deep water during the glacial periods, but direct evidence regarding deglacial ventilation changes in the mid-deep depth North Pacific water is sparse and often equivocal. Strong evidence exists in support of major and synchronous surface ocean deglacial paleoclimatic changes between the trans northern Pacific region and the North Atlantic. Proposals of major changes in north Pacific intermediate waters during the last deglacial climate oscillations have remained controversial in the absence of sufficient carbonate containing sediment sequences close to the source of North Pacific Intermediate Waters (NPIW), and key in understanding Pacific overturning circulation. Here for the first time we present evidence for such changes from sediment sequences from the NW Pacific close to the source regions. Radiocarbon age differences between coexisting planktic and benthic foraminifera are presented for five well dated mid-deep depth cores as a measure of changing ventilation during deglaciation and glacial warming periods. The 3 piston cores from water depth 1366m(MR01-K03 PC4/5), 1183m (CK05-04C9002A-B), 970m(IMAGES MD01-2409), the western North Pacific, 1 piston core from water depth (MR06-04) from the Bering sea and 1 gravity cores from 3390m(NGC108), the Shatsky Rise were investigated. The deglacial ventilation change records in the western North Pacific exhibit a clear antiphase relation with the midwater Atlantic Meridional Overturning Circulation. NPIW ventilation rates significantly decreased during the warm episodes of the B/A and preBoreal early Holocene in response to teleconnected atmospheric changes, reorganization of oceans overturning circulation and/or bipolar seesaw. During early deglaciation, the North Pacific Ocean may have acted as a major source for atmospheric CO2 through active NPIW ventilation. In the conference, we will discuss ventilation changes with other proxies records such as alkenones, TEX86, and Mg/Ca, and 231Pa/230Th.