



Deep water formation in the North Pacific and deglacial CO₂ rise?

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During the last deglaciation, atmospheric CO₂ concentrations increased in a series of steps, together with millennial-scale shifts in global climate. A recent study suggests a switch to deep-water formation in the North Pacific during Heinrich Stadial 1 that may have led to a significant release of deep-sequestered CO₂ from the North Pacific to the atmosphere within the early period of the last deglaciation. Accordingly, changes in deep-water circulation of the North Pacific might hold important clues toward resolving the puzzle of the carbon sources that caused the rise of atmospheric CO₂ during the last deglaciation. However, only a few proxy-records are available from the deep North Pacific. Whether old and CO₂-rich waters from the deep North Pacific were in exchange with the surface ocean during Heinrich Stadial 1 and contributed to the observed atmospheric CO₂ rise is not well constrained. Here we provide new proxy-data from a deep-sea core of the Northwest Pacific (SO 201-2-12KL; 53°59.47N; 162°22.51'E; 2145 m water depth) to further investigate circulation changes in the North Pacific during the last deglaciation. Our results are based on the stable carbon isotopic composition ($\delta^{13}\text{C}$) of epibenthic foraminifera *Cibicides lobatulus*, a species that faithfully records the $\delta^{13}\text{C}$ DIC of ambient seawater. Our results shed new light on deglacial changes in nutrient- and circulation dynamics of the deep North Pacific. Further, based on our new proxy-data and published proxy-data from shallower and deeper sites of the subarctic Pacific we further discuss the potential of deep-water formation in the North Pacific and its role in atmospheric CO₂ shifts during the last deglaciation.