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Deep water formation in the North Pacific and deglacial CO_2 rise?

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During the last deglaciation, atmospheric CO_2 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 CO_2 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 CO_2 during the last deglaciation. However, only a few proxy-records are available from the deep North Pacific. Whether old and CO_2-rich waters from the deep North Pacific were in exchange with the surface ocean during Heinrich Stadial 1 and contributed to the observed atmospheric CO_2 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 (δ13C) of epibenthic foraminifera Cibicides lobatulus, a species that faithfully records the δ13C 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 CO_2 shifts during the last deglaciation.