Denitrification signals in the north Pacific since the Last Glacial Maximum

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The influence of past variations in water column denitrification (WCD) in the eastern tropical Pacific (ETP) on the western tropical Pacific (WTP) remains ambiguous, due to the deficiency of enough down-core $\delta^{15}N$ records in the WTP. In this study, a comprehensive measurement of bulk nitrogen and carbon, major geochemical elements, and AA and derived degradative proxies was performed down a core from the northern WTP to assess the possibility of two major processes induced influence on sedimentary $\delta^{15}N$ signature. Our results suggested that the bulk $\delta^{15}N$ could be applicable as a proxy for phytoplankton-fueling $\delta^{15}N$. Further, based on a comparison of $\delta^{15}N$ records obtained in bulk sediments and coral samples in the north Pacific since the Last Glacial Maximum (LGM), the easterly advection of WCD signal from the northern ETP was proposed to play a dominant role in regulating the sedimentary $\delta^{15}N$ variation in the northern WTP and adjacent margin seas by ocean circulations. As a result, the signals of local N_2 fixation in the SCS and the OT would have been greatly masked by the WCD signals because of the opposing $\delta^{15}N$ signals of the two processes, leading to an underestimation of local N2 fixation in the interglacial periods. A remarkable turnover on $\delta^{15}N$ trends and thus WCD extent was observed in the early Holocene, which could be attributed to climate-induced oxygen availability change.