

# Changes in Deep Pacific Carbon Storage Over the MPT? B/Ca Derived Deep Pacific $\Delta\text{CO}_3^{2-}$ Pre & Post Mid-Pleistocene Transition

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During the Mid-Pleistocene Transition (MPT, 0.7-1.2 million years ago), internal climate factors caused a large-scale shift in the timing of glacial-interglacial cycles from 41-kyr to 100-kyr periodicity. Because the ocean is the planet's largest carbon reservoir, it is imperative to investigate how changes in deep ocean carbon storage have impacted global climate across key climate transitions such as the MPT. The deep Pacific holds much more carbon than the deep Atlantic, but spatial variations in carbon storage across the MPT within this region remain poorly quantified. To address how deep Pacific Ocean carbon cycling and storage changed over the MPT, we analyzed B/Ca ratios in shells of the benthic foraminifer *Cibicides wuellerstorfi* from ODP Site 805 (Ontong-Java Plateau, 3200 m water depth). Benthic B/Ca is a proxy for deep ocean carbonate saturation ( $\Delta\text{CO}_3^{2-}$ ) and we studied three discrete glacial-interglacial cycles across the MPT. In agreement with previously published B/Ca,  $\delta^{18}\text{O}$  and  $\delta^{13}\text{C}$  data from adjacent site 806, our results from Marine Isotope Stage (MIS) 10 show that  $\Delta\text{CO}_3^{2-}$  decreased in tandem with  $\delta^{18}\text{O}$  and  $\delta^{13}\text{C}$  at site 805. This trend suggests that  $\delta^{13}\text{C}$  and  $\Delta\text{CO}_3^{2-}$  co-varied with global climate changes and may reflect addition of respired  $\text{CO}_2$  at the glacial onset.  $\Delta\text{CO}_3^{2-}$  increased during the late glacial period, possibly reflecting the long-term rise in alkalinity due to low sea level. In contrast to MIS 10 and 12,  $\Delta\text{CO}_3^{2-}$  remained relatively constant across MIS 16. Within the 40-kyr world, data from MIS 54-53 show deep Pacific  $\Delta\text{CO}_3^{2-}$  changed in unison with planktic  $\delta^{18}\text{O}$  from the same site, suggesting that deep sea  $\Delta\text{CO}_3^{2-}$  may also have co-varied with climate during this time period.  $\delta^{13}\text{C}$  data from the same samples will shed further light on possible changes in ocean circulation and respired carbon storage across this important climate transition.