pH in Antarctic Zone surface waters over the last glacial cycle

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Ice core records show that over the past 800,000 years cold, glacial periods have been characterised by low atmospheric CO_2, reflecting a shift in carbon storage from the atmosphere to the deep ocean during these times. As the region which ventilates the majority of the deep ocean today, the Southern Ocean (SO) has been invoked to play a central role in this glacial CO_2 change. Due to limited productivity, carbon in waters upwelled in the SO has the opportunity to equilibrate with the atmosphere, resulting in a "leak" of CO_2 to the atmosphere [1]. Reducing this leak via a physical process in the Antarctic Zone of the SO during glacial periods has been suggested as a potentially important process which could account for glacial CO_2 drawdown. Two such mechanisms have been proposed: increased sea-ice cover [2] or enhanced surface stratification [3]. Each mechanism would act to impose a unique pH signature on SO surface waters. Here we present boron isotope (pH-proxy) and test mass records of samples of the planktic foraminifera *Neogloboquadrina pachyderma* from sediment core PS1506, located in the Weddell Sea, complimenting previously published records from the core [4]. We find signatures of both stratification and sea ice cover at different intervals of the last glacial cycle, suggesting both may play an important role in CO_2 drawdown.

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