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New pH evidence for changes in intermediate South East Pacific carbon storage during the last deglaciation

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The leading hypotheses proposed to explain the rise in atmospheric CO₂ during the last glacial to interglacial transition proposes enhanced carbon transfer from the intermediate and deep oceans to the atmosphere via the intensification of southern ocean upwelling. To test this scenario, we generated a high resolution record of boron isotopes ($\delta^{11}\text{B}$) and B/Ca (proxies for pH and carbonate ion concentration, respectively) measured on shells of the benthic foraminifera *C. wuellerstorfi* from a marine sedimentary core located at intermediate depth (1536m) on the Chilean margin. Our records confirm the link between changes in ocean circulation and variations in the carbonate chemistry at this site. The data also reveal the increase of intermediate water pH at the very late LGM, before the beginning of the deglaciation and the rise in atmospheric pCO₂. To account for this observation, we suggest the existence of an early release of carbon from the intermediate ocean to the atmosphere in response to sea ice retreat occurring at the same time. The lack of any clear increase in atmospheric CO₂ suggests that this release of intermediate ocean carbon was compensated by enhanced biological pumping.