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The Southern Ocean's role in glacial-interglacial climate change

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The Southern Ocean is an important regulator of global CO_2 levels and likely had a key role in lowering atmospheric CO_2 levels during the Last Glacial Maximum (LGM) and driving the subsequent increase during the following deglaciation. Nonetheless, debate continues surrounding the relative importance of Northern versus Southern Hemisphere forcing during deglacial events. During the LGM, North Atlantic sourced waters appear to have shoaled during the LGM and were largely absent from the glacial Southern Ocean. This shoaling along with increased ocean stratification, contributed to glacial carbon sequestration in deep waters. Southern Ocean dynamics appear to have been substantial, or even the critical, factors initiating the termination of the LGM before deepening of North Atlantic sourced waters. Warming at mid-latitudes of the Southern Hemisphere and the Southern Ocean began at ~21 ka, preceding deglaciation, indicating insolation changes could have driven early atmosphere–ocean warming that initiated the shifting of ocean fronts leading to the release of carbon sequestered in the LGM.