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# Perturbations in Antarctic bottom water formation in the Atlantic sector of the Southern Ocean during the last peak interglacial period

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Interglacial climate conditions are generally characterized by relatively strong and persistent deep-water formation both in the North Atlantic and in the Southern Ocean, and overall 'stable' climate conditions. Recent evidence, however, challenges the notion of persistent deep-water formation in both hemispheres during the last interglacial, and points at rapid reductions in convective mixing that may have lasted few centuries to millennia. The spatial pattern of this phenomenon and its driving mechanisms remain poorly constrained. Here we present multi-proxy data for rapid reductions in bottom water oxygen in the central sub-Antarctic Atlantic (sediment core MD07-3077, 44°9.20'S, 14°13.69'W, 3776 m water depth) during the warmer-than-present period of the last interglacial (i.e., 132-116 kyr before present). The first of these "stagnation events", as they are often denoted, is synchronous, within dating uncertainties, with a similar drop in bottom water oxygenation at a more southern site, ODP Site 1094, south of the Polar Front. Our findings hint at a widespread and significant change in the formation rate and/or end-member pre-formed oxygen levels of Antarctic bottom water (AABW) in the South Atlantic during the last interglacial. The onset of these events closely coincides with increases in sea surface temperatures in the sub-Antarctic Atlantic above average Holocene levels. Although this needs to be further tested at more proximal sites, we argue that stagnation events were likely driven by excess ocean warming, in particular below ice shelves in the Weddell Sea, that may have perturbed AABW formation and/or air-sea gas exchange in that region during the last interglacial. Our findings highlight important feedback mechanisms linking hydrographic conditions at the sea surface, instabilities of the local cryosphere, and the strength of deep water formation in warmer-than-present climate scenarios – the full understanding of which has relevance for assessing the trajectory of future changes in the Southern Ocean.