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Circumpolar influence of Weddell Sea anomalies

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Antarctic marginal seas are the warm tub for the floating extensions of the Antarctic ice sheet. The analysis of a 200-year (1900–2099) integration of a regional ice-ocean model (BRIOS-2.2) forced with the atmospheric output of an IPCC-20C3M scenario simulation with the coupled atmosphere-sea ice-ocean ECHAM5-MPIOM reveals that these seas exhibit significant decadal variability. Changes in bottom salinity on the southern Weddell Sea continental shelf, caused by a variable sea ice cover and related modification of surface waters near the Greenwich Meridian, influence the circulation such that cold waters from the Weddell Sea flush into the southeast Pacific Ocean with varying intensity. The deep temperature signal propagates westward and onto the continental shelves of the Amundsen and Ross Seas. Weddell Sea anomalies thus could be a new aspect to consider at the present search for mechanisms controlling the flow of warmer deep waters towards the floating extensions of the West Antarctic Ice Sheet.