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Ross Sea water masses numerical investigation using the Regional Ocean Model System - ROMS with a sea ice/ice sheet parametrization module

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The Southern Ocean (SO) is a key region for the climate system due to important cold, dense water formation around the Antarctic continental shelf, which provides the link between upper and lower branches of the global thermohaline circulation (THC). Since sea ice is rapidly affected by climate changes and is directly linked to the THC, which is responsible for heat exchange and storage, many global modeling studies have been conducted trying to understand the impact of changes in sea ice on deep water masses formation in the SO. Although grid resolution has improved, IPCC class models seem unable to fully represent deep water formation around Antarctica. Looking for a better regional simulation, we have used the Regional Ocean Model System with a sea ice/ice sheet parametrization in a high resolution grid (less than 10km over the inner continental shelf) for a normal year simulation. Results allowed to identify major water masses in the Ross Sea: Antarctic Surface Water (AASW), Circumpolar Deep Water (CDW) and Antarctic Bottom Water (AABW). These preliminary results show how regional modeling may improve specific oceanic processes representation in polar regions and the need of a parametrization for the cryosphere components.