



Response of the Southern Ocean dynamics to the changes in the Antarctic glacial runoff and icebergs discharge

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This study examines how changes in the freshwater discharge from the Antarctic (liquid runoff and icebergs) affect stratification and ocean circulation in the Southern Ocean. The changes in the ocean circulation could potentially modify transports of the warm subsurface waters onto the continental shelves and increase ice sheet melting. We investigate impacts of the increased freshwater discharge in the 1990s-2000s on the subsurface waters in the Southern Ocean in the NEMO 1° global sea ice-ocean model. In the simulations the warming signal is largely circum-Antarctic, with “hot spots” in the Bellingshausen-Amundsen and Ross seas. The warming of the subsurface waters in the Bellingshausen-Amundsen Sea exceeds 0.5°C/decade. Differences in spreading of the liquid freshwater and icebergs in the Southern Ocean are investigated. Hindcasts and forward projections with the eddy-admitting global NEMO 1/4° model are diagnosed to examine regional trends in the ocean and sea ice states and to attribute these to the changes in the freshwater forcing and wind. The study contributes to the "Poles Apart" research project and is funded by the Natural Environment Research Council UK.