



How should runoff around Antarctica be simulated in an ocean model

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Ice shelves melting and icebergs calving are the main components of the fresh water runoff around Antarctica. This fresh water source is spread between the surface and about 1000m depth and can also be colder than the winter surface water due to the pressure effect on the freezing point temperature (from -1.8°C in surface up to -2.5°C in depth).

In many ocean and climate models, the fresh water flux due to ice shelf and iceberg melting is represented as a surface fresh water source. However, the surface runoff, derived from ice sheet surface melting is negligible in Antarctica. To model the ice shelf and iceberg melting by surface instead of deep runoff could lead to large errors in sea ice and ocean properties on the continental shelf around Antarctica. In order to evaluate the impact of this fresh water flux misrepresentation, three ways to model the runoff (surface runoff, deep runoff and a full ice shelf cavity model) are implemented and compared in a regional model of Pine Island Bay. The sensitivity of the ocean circulation, water masses and sea ice to the runoff parametrisation will be discussed.