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Heat and salt budgets in the Hornsund fjord

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Climate change is affecting all the Svalbard fjords, which are more or less subject to global warming. In situ observations in the Hornsund fjord indicate that more and more warm Atlantic water is reaching the fjord as well, and this may influence the rate of melting of sea ice and glaciers, which is likely to increase.

More freshwater enters the fjord in several different ways. Melting glaciers bring freshwater in the form of surface inflows from freshwater sources, in the form of submarine meltwater at the interface between ocean and ice, and in the form of calving icebergs. Retreating glaciers and melting sea ice allow the warm Atlantic waters to reach increasingly inland fjord basins and more heat stored in the fjords causes increased melting of the inner fjord glaciers. The increasing amounts of freshwater in the fjord can change the local ecosystem.

Estimates of the heat and the salt fluxes will give a better understanding of how the ocean interacts with the glaciers through submarine melting and vice versa, how glaciers interact with the ocean through freshwater supply. Budgetary conditions will be calculated from the high resolution model results (HRM) of velocity, temperature and salinity for the interior of the Hornsund fjord.

Calculations were carried out at the Academic Computer Centre in Gdańsk