



Hydrographic response of Hornsund Fjord (South Spitsbergen) to climate change

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Hornsund is the southernmost end-member in the network of fjords of western Spitsbergen. It is a medium, through which different waters mix, transform and affect land and marine ecosystems. It is a great laboratory for study of direct interaction between oceanic and land fjord boundaries as a response to climate change.

Investigations in the fjord are mainly based on summer set of data collected every July between 2001 and 2016 during Arctic cruises on RV Oceania, a ship belonging to the Institute of Oceanology Polish Academy of Sciences. High resolution measurements of temperature and salinity were conducted using CTD probe in a scanfish mode. Supplementary data come from Polish-Norwegian cooperation in the AWAKE-2 project, which include hydrographic measurements carried out from a small boat in spring and late summer as well as a full year hydrographic record from moorings.

Over 16-years of regular measurements significant changes in water temperature, salinity and water mass distribution in the fjord have been observed. Hydrographic patterns were strongly dependent on the extreme oceanic events in the Svalbard area, either massive flooding of the West Spitsbergen Shelf by the Atlantic Water or inflow of cold water and sea ice carried by the Sørkapp Current from the Barents Sea. Moreover, extremely warm winters observed during recent years and decrease in winter ice cover in the fjord had great implication on the Winter Cooled Water, which was typically seen in summer in the most inner part of the fjord, but seems to be a rare feature in the coming years. The first attempt to assess the role of the Sørkapp Current for Hornsund Fjord is addressed as well.