



Preliminary validation of WRF model in two Arctic fjords, Hornsund and Porsanger

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Our research is focused on development of efficient modeling system for arctic fjords. This tool should include high-resolution meteorological data derived using downscaling approach.

In this presentation we have focused on modeling, with high spatial resolution, of the meteorological conditions in two Arctic fjords: Hornsund (H), located in the western part of Svalbard archipelago and Porsanger (P) located in the coastal waters of the Barents Sea. The atmospheric downscaling is based on The Weather Research and Forecasting Model (WRF, www.wrf-model.org) with polar stereographic projection. We have created two parent domains with grid point distances of about 3.2 km (P) and 3.0 km (H) and with nested domains (almost 5 times higher resolution than parent domains). We tested what is the impact of the spatial resolution of the model on derived meteorological quantities. For both fjords the input topography data resolution is 30 sec. To validate the results we have used meteorological data from the Norwegian Meteorological Institute for stations Lakselv (L) and Honningsvåg (Ho) located in the inner and outer parts of the Porsanger fjord as well as from station in the outer part of the Hornsund fjord. We have estimated coefficients of determination (r^2), statistical errors (St) and systematic errors (Sy) between measured and modelled air temperature and wind speed at each station.

This approach will allow us to create high resolution spatially variable meteorological fields that will serve as forcing for numerical models of the fjords. We will investigate the role of different meteorological quantities (e. g. wind, solar insolation, precipitation) on hydrographic processes in fjords.

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