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The influence of Weather Research and Forecasting Model (WRF) parametrization for the accuracy of the model results in the Porsanger fjord

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The main aim of presented work is to quantify the impact of using different parametrization of the Weather Research and Forecasting Model (WRF, version 4.0) for the accuracy of the model results in the Porsanger fjord, which is located in the northern part of Norway, in the coastal waters of the Barents Sea. The fjord may be divided into three different zones: inner (0-30 km), middle (30-70 km) and outer (70-100 km). Because of the surrounded hills and mountains, we observe different atmospheric conditions in the particular zones in the fjord.

Based on the WRF model we want to show these local differences in weather conditions inside the fjord and calculate multiyear local trends. Nevertheless, as the first step, we have checked how atmospheric conditions are sensitive on different parametrization of the model. The motivation comes from the fact that until now study of climate changes has been usually focused on larger scale, and have not described trends in small climate sensitive regions, where substantial increase of air temperature and glacier retreat are observed. The example of these climatic sensitivity areas are high-latitude fjords.

The model domain was set to 1 km. Initial high spatial resolution ERA-Interim reanalysis (0.125°) were provided by the European Centre for Medium-Range Weather Forecasts (ECMWF, www.ecmwf.int). Completed work included 6-month simulations of the study area with different parametrizations (e.g. planetary boundary layer schemes, longwave and shortwave radiation, surface physic options).

The results were compared with each other and with the meteorological data from the Norwegian Meteorological Institute (www.eklima.met.no). The parametrization which gave the best agreement of simulation results with the observational data, will be used for future modelling oceanographic processes within the fjord.

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