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Sensitivity of atmospheric Weather Research and Forecasting (WRF) model results on planetary boundary layer schemes and other physic options in the Porsanger fjord

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The research is focused on the application of the Weather Research and Forecasting Model (WRF, model version 4.0 with the Advanced Research core) to the Porsanger fjord, the most extended area to the north in the Scandinavian Peninsula. Because of the significant size of the fjord as well as due to complicated topography of surrounding mountains and hills, significant differences in atmospheric conditions in different parts of the fjord are observed. The inner part of the fjord is strongly influenced by continental climate, in contrast to the outer part, being within the marine climate zone. By using the WRF model we want to obtain spatial high-resolution atmospheric data as close as possible to the real in situ situation.

One of the goals of the present work is to quantify the impact of using different planetary boundary layer (PBL) and surface physics parameterizations for the accuracy of the model results in our study area. These options are a part of the standard WRF computer code. Completed work included 1-year simulations with different planetary boundary schemes and physics schemes. Then we have intercompared these results with each other and with the in situ meteorological data obtained from the Norwegian Meteorological Institute (www.eklima.met.no). The model set-up, which gave the best agreement of model results with the observational data, will be used for future research, directed at modeling oceanographic processes within the fjord.

The spatial resolution of the WRF model was set to 1 km. Because selected model domain has such high grid cell resolution the initial conditions were based on reanalysis data with the highest spatial resolution (0.125°) provided by the European Centre for Medium-Range Weather Forecasts (ECMWF, www.ecmwf.int).

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