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The differences between simulations from ROMS model using two grids of the Porsanger fjord in Norway (dx_1=800 m, dx_2 = 160 m).

Paulina Aniśkiewicz (1,2) and Małgorzata Stramska (1)

(1) Institute of Oceanology, Polish Academy of Science, Sopot, Poland, (2) Centre for Polar Studies, Faculty of Earth Sciences, University of Silesia, Sosnowiec, Poland

This research was focused on modeling with high spatial resolution of the hydrodynamic conditions in the Porsanger fjord using Regional Ocean Modeling System (ROMS). The fjord is located in the coastal waters of the Barents Sea and based on the bathymetry can be divided into three zones: inner (0-30 km), middle (30-70 km) and outer (70-100 km). Because the environment in the inner part differs significantly from the other zones and holds a unique arctic ecosystem, e.g. sea surface salinity is lower (27-28 PSU) than in the other zones (35-36 PSU), it is important to develop modeling system in this fjord, to understand mechanisms responsible for these local changes.

To check the differences between simulations with two grids of the Porsanger fjord (dx_1 = 800 m, dx_2 = 160 m) we have compared the model results with observational data collected in 2014 and 2015 during the Nordflux project. For comparisons we have used subsurface currents from vertical profiles and water temperatures at 140 m depth collected with the Nortek Continental 190 kHz ADCP deployed on a mooring (June 9 – June 23, 2014). Water temperature and salinity were compared with data from Seacat NY deployed from a buoy at 20 m depth. The comparison of modeled temperature with ADCP data was done for five ROMS depths: 130 m, 135 m, 140 m, 145 m,150 m. The comparison of modeled temperature and salinity with buoy data was done for five ROMS depth: 10 m, 15 m, 20 m, 25 m, and 30 m. The comparison of modeled subsurface currents with ADCP measurements was done in vertical profiles (0-135 m depth).

Low values of correlation coefficient of salinity may be caused by significant fresh-water discharge. The large temporary river-water inflow may change local salinity immediately. ROMS model simulates water temperature changes at 20 m depth more properly. The correlation coefficient was high in all grid points. The best correlation between model and observed currents was for north velocity component in all nine grid points at all depths. The main reason may be that the ROMS model is focused on well predict the south-northern water exchange between the fjord and surrounded ocean. Because of comparing the mooring data.

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