



Climate Simulations of the Barents Sea Region

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In the context of the EU-Project BALANCE (<http://balance1.uni-muenster.de>) the regional climate model REMO is used for extensive calculations of the Barents Sea climate to investigate the vulnerability of the Barents Sea Region to climate change.

To investigate the climate of the Barents Sea Region the following simulations have been performed with the hydrostatic regional climate model REMO. For simulations of today's climate of the Barents Sea region REMO has been calculated from 1979 until 2000 at ~18 km horizontal resolution. For initialization and at the boundaries Analysis- and Reanalysis-data of the European Center for Medium range Weather Forecast (ECMWF) have been used. This simulation is called baseline run and has been validated with observations from the Arctic Meteorology and Climate Atlas (AMACA). The validation has been focused on 2m-temperature and precipitation according to the available observations.

A long run with the regional climate model REMO has been performed to simulate the climatic change of the Barents Sea region between 1961 and 2100 (Control and Climate Change run). For investigations of future climate development at ~50 km horizontal resolution REMO has been driven by the transient ECHAM4/OPYC3 IPCC-SRES B2 scenario. The ECHAM4/OPYC simulation has a warm bias in the sea surface temperature (SST), it started 1860 with the SST of 1990. Therefore it is suggested to look only at differences of time slices and not at the absolute values themselves. The analysis of the scenario describes the hypothetical changes in the Barents Sea region in the next century.

Decadal time slices have been investigated to point out in which season and in which region the biggest effects may occur. The annual mean 2m-temperature of the control and climate change run shows a clear trend as expected, the 2m-temperature increases

about 5 degrees. The mean temperature over land is generally higher than the mean temperature over sea. The published temperature increase of the Arctic in the Arctic Climate Impact Assessment (ACIA, 2004, <http://amap.no/acia>) from 1960 to today of 1.5 °C is in good agreement with our results. From 1960 to 2000 the annual mean temperature of the Barents Sea region rises exactly in the same way as in the simulation.