

Comparison of regional climate simulations, ERA-Interim reanalysis data and in-situ measurements in the Laptev Sea area during the winter season

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Regional climate model simulations using the COSMO-CLM (Consortium for Small-scale MOdelling – Climate Limited area Mode) driven by ERA-Interim reanalysis data have been performed. We compared 3D variables (wind speed and temperature) with ERA-Interim reanalysis data and with soundings for different pressure levels for the winter seasons of 2002-2014 (November – April). This model runs have a spatial resolution of about 15 km. The measurements of the soundings were interpolated to the COSMO-CLM levels for better comparison. 2D variables (2m-temperature, wind speed at 10 m height, mean sea level pressure and longwave radiation) were compared to ERA-Interim reanalysis data (winter seasons 2002-2014) and tower measurements (winter seasons 2012-2014). Additionally, runs with 5 km and 15 km were performed from November 2014 to December 2014 to show the impact of the higher spatial resolution on the model output. The COSMO-CLM simulations show a good agreement with ERA-Interim reanalysis data for the whole period and all variables. High coefficients of determination and a low RMSE can be seen for the comparison with in-situ measurements (tower, soundings). However, the wind speed near the ground is underestimated due to local effects or the overestimation of the roughness length. Also the simulation of the upward longwave radiation shows some uncertainty. The estimated reason is probably the choice of a wrong emission coefficient or an uncertainty of the soil temperature.