Geophysical Research Abstracts
Vol. 16, EGU2014-11565, 2014
EGU General Assembly 2014

Regime-dependent validation of simulated surface wind speed in coastal areas of the North Sea

Ivonne Anders (1) and Burkhardt Rockel (2)

(1) Central Institute for Meteorology and Geodynamics (ZAMG), Climate Modelling, Vienna, Austria (ivonne.anders@zamg.ac.at), (2) Helmholtz-Zentrum Geesthacht Centre for Materials and Coastal Research, Geesthacht, Germany (Burkhardt.Rockel@hzg.de)

The knowledge of the wind climate at specific locations is of vital importance for risk assessment, engineering, and wind power assessment. Results from regional climate models (RCM) are getting more and more important to enlarge the investigation from local to regional scale.

In this study we investigate the simulated near surface wind speed by a regional climate multi model ensemble carried out in the EU funded project ENSEMBLES. Within this project several participating European institutions run their regional climate models (RCM) for the same European domain (including the Mediterranean and Island) with the same grid size of 0.44° and in a second simulation 0.22°. The simulations use ERA40 reanalysis as forcing data and cover at least the time period from 1961 to 2000. To verify the near surface wind speed simulated by all participating models we compared not only daily mean of simulated 10m-wind speed but also daily maximum values to observation data. The special focus is on the coastal regions of the Netherlands and Germany.
The objective procedure to classify the atmospheric circulation near the surface for the North Sea goes back to investigations of Jenkinson and Collison (1977). This simple and efficient method is based on the areal pressure distribution at the mean sea level (MSLP) and the derivation of two representative indices for wind and velocity at 16 grid points covering the North Sea and the surrounding with a spatial resolution of 10° by 5° (longitude by latitude). The definition of the circulation type, but also the identification of storm events are finally based on empirical relations between the two indices.

Based on this weather classification we carry out a regime-dependent validation of the simulated surface wind speeds using the described analysing methods. We applied several measures and skill scores to analyse the RCMs performance compared to the driving field and to evaluate accuracy gain by including higher spatial resolution of the grid cell. Results for bias, RMSE, standard deviation but also for Brier Skill Score and Perkins adapted skill score have been calculated. The differences can be addressed very well to the different large scale atmospheric conditions. At few stations e.g. Helgoland RCMs show an added value concerning the quantiles assessment of daily mean surface wind speed compared to the driving field.

Reference: Jenkinson A, Collison F (1977) An initial climatology of gales over the north sea. Synoptic Climatology Branch Memorandum 62:18pp, UK Met Office