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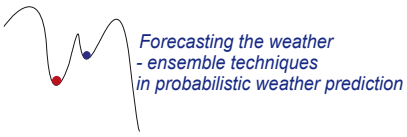

Regime-dependent validation of simulated surface wind speed

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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 importantto enlarge the investigation from local to regional scale.
In this study we investigate the simulated near surface wind speed by a 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. With the help of a change detection algorithm and together with the provided stations histories we defined two time windows where as many as possible of the measurements are less disturbed. For the Netherlands we choose observation data of 10 stations for the time periods 1971-1983 and 5 stations from 1971 to 2000, for the German coast it is 11 and 8 stations respectively. 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 don't show strong seasonal dependence. The differences can be addressed to the calm summer periods and the stormy autumn and winter month where large scale events are more important than local effects. 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.
Sanchez-Gomez et al (2008) used the simulation results from the regional climate model ensemble to investigate the models ability to reproduce the large-scale atmospheric circulation of the driving fields of ERA40 Reanalysis data. Four weather regimes (Blocking (BL), Zonal (NAO+), Atlantic Ridge (AR) and Greenland Anticyclone (NAO-)) have been analysed for every day in the summer months (from June to September) and the winter months (from December to March) separately for the period 1961 to 2000. Based on this weather classification we carried out a regime-dependent validation of the simulated surface wind speeds using the described analysing methods.
But do these weather regimes derived for whole the European domain really represent the wind climate in the area of interest? To answer the question we repeated all analysis according to the daily prevailing wind direction derived from observation data.

References

E. Sanchez-Gomez, S. Somot and M. Dequé (2008): Ability of an ensemble
of regional climate models to reproduce weather regimes over Europe-Atlantic during the period 1961-2000.
Climate Dynamics, Vol.33(5), 723-736.