Geophysical Research Abstracts
Vol. 17, EGU2015-9266, 2015
EGU General Assembly 2015
© Author(s) 2015. CC Attribution 3.0 License.

North Sea wind climate in changing weather regimes

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

Results from regional climate models (RCMs) are getting more and more important in future wind climate assessment. From RCMs often only the daily wind speed is available, but no information on prevailing wind direction of each day. Weather regime classification can close this gap and models ability of simulating surface wind speed can be analysed in detail. Several objective regime classifications have been investigated to be a sufficient diagnostic tool to evaluate the present wind climate at the German and Dutch coastal area of the North Sea.

The classification by Jenkinson and Collison (1977) uses values for mean sea level pressure at 16 locations centered over the North Sea. Beside the predefined 8 prevailed wind directions and the two possibilities on cyclonic or anticyclonic turbulence, 2x8 hybrid weather types can be defined. In this way 27 different regimes can be distinguished including a class of non-classifiable cases. The 27 regimes could be reduced to a number of 11 by allotting the hybrid types to the directional or the centered types. As the classification is carried out for the North Sea based on ERA40 mean sea level pressure the different regimes clearly reflect the mean wind characteristics at the stations. Comparing the wind roses for the individual observations leads to the assumption that the regime classification described before fits the requirements to carry out the regime dependent evaluation of the RCMs with a focus on the German and Dutch coast.
Trends in the occurrence of the regimes in the winter period of 1961 to 2000 show an increase of the regimes with Western and Southwestern wind directions and a decrease of wind events from Eastern directions in the North Sea. The trend is dominated by the strong positive phase of the NAO especially in the months January to March starting in the beginning of the 1980s.
Due to the applied method ERA40 and the RCMs do not necessarily show the same regime at each day. The agreement among the RCM simulations carried out in the ENSEMBLES framework and ERA40 has been analysed in a last step.

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