Geophysical Research Abstracts
Vol. 14, EGU2012-2784, 2012
EGU General Assembly 2012

Estimation of wind regime from combination of RCM and NWP data in the Gulf of Riga (Baltic Sea)

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Gulf of Riga is a semi-enclosed gulf located in the Eastern part of the Baltic Sea. Reliable wind climate data is crucial for the development of wind energy. The objective of this study is to create high resolution wind parameter datasets for the Gulf of Riga using climate and numerical weather prediction (NWP) models as an alternative to methods that rely on observations with the expectation of benefit from comparing different approaches.
The models used for the estimation of the wind regime are an ensemble of Regional Climate Models (RCM, ENSEMBLES, 23 runs are considered) and high resolution NWP data. Future projections provided by RCM are of interest however their spatial resolution is unsatisfactory.
We describe a method of spatial refinement of RCM data using NWP data to resolve small scale features. We apply the method of RCM bias correction (Sennikovs and Bethers, 2009) previously used for temperature and precipitation to wind data and use NWP data instead of observations. The refinement function is calculated using contemporary climate (1981- 2010) and later applied to RCM near future (2021 – 2050) projections to produce a dataset with the same resolution as NWP data. This method corrects for RCM biases that were shown to be present in the initial analysis and inter-model statistical analysis was carried out to estimate uncertainty.
Using the datasets produced by this method the current and future projections of wind speed and wind energy density are calculated.

Acknowledgments:
This research is part of the GORWIND (The Gulf of Riga as a Resource for Wind Energy) project (EU34711).
The ENSEMBLES data used in this work was funded by the EU FP6 Integrated Project ENSEMBLES (Contract number 505539) whose support is gratefully acknowledged.

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