

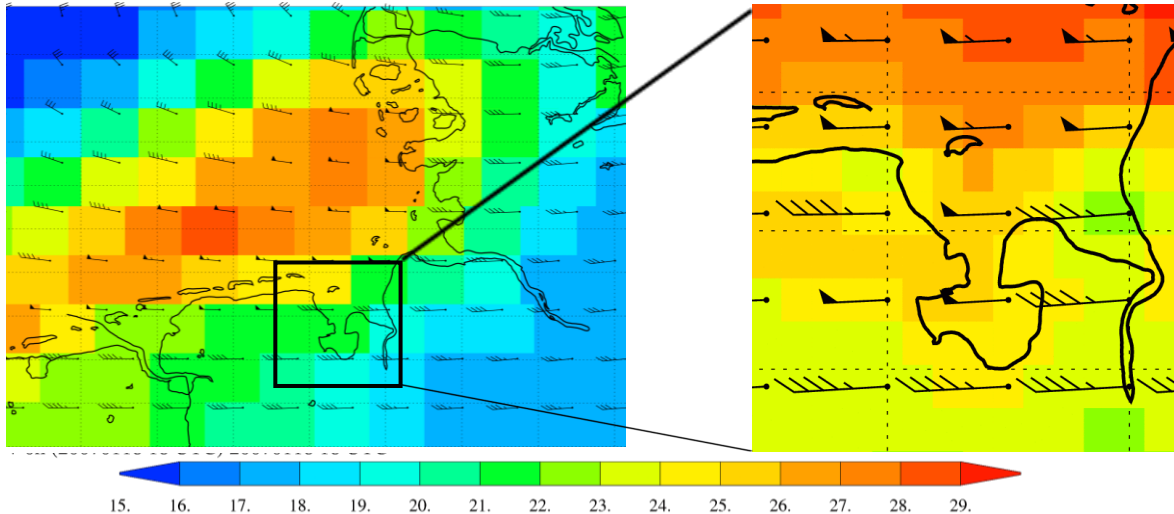
Master Thesis at ForWind in Wind Energy Meteorology

Topic

Spatial and temporal resolution impact in large-scale simulations of wind power in Europe

Confidence into the long-term simulation of wind and solar power is necessary when designing Europe's future power supply system with very high shares of Renewable Energy Sources (RES). Gridded data like wind speed (or solar irradiance) is taken from mesoscale Numerical Weather Prediction (NWP) models. The currently highest available spatial resolution is 7km and is provided by the German Weather Service (DWD) every hour. The aim of this Master Thesis is to investigate if a downgrading of resolution will affect large-scale generation pattern in wind energy or if indications can be found that a higher resolution is necessary. As very long time series (>40 years) will be processed in the future, it is worth investigating the grade of detail and effort to do skilled simulations to limit required computer resources.

Firstly, emphasis is given to match the simulated wind power in the German control zones of the 4 Transmission System Operators (TSO) with observed wind power data. It shall be studied if a possible resolution impact can be accounted for by parameterizations in the simulation model. Secondly, a sensitivity study shall be conducted to describe the increasing simulation skill with increasing resolution and with increasing size of the control zone. The results shall be applied to define (lower limit) requirements for a wind power simulation system for Central Europe. The use of ForWind's new super-computer is envisaged for this master thesis.



Wind speed analysis in 70m height in m/s at 18. Jan 2011, 18UTC (landfall of storm Kyrill) from ECMWF (left, 25km) and DWD (right, 7km).

Requirements

- enthusiasm for meteorology and/or wind energy; scientific and technical work and efficient handling of huge data volumes
- good knowledge in statistics, data analysis and programming (preferably Fortran/C and/or IDL) is essential

Contact

Dr. Lueder von Bremen (lueder.von.bremen@forwind.de), Phone: 0441 36116-735

Group: Large-Scale Wind Power Simulation and Prediction