



How the German Weather Service optimizes its Ensemble forecasts for renewable energies and current-carrying capacity

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Renewable energies are an important part of the German power supply. On days with favorable weather conditions, renewable energy sources can even satisfy the total nationwide demand of electricity. For higher productivity most wind turbines are built in the north while solar power plants are mostly located in the south of Germany. This spatially inhomogeneous production of wind and solar power raises costs and stress the power grid. Reliable and accurate weather forecasts provide the basis for predicting the power production levels and associated transport of energy from regions with surplus production to those with high levels of consumption. For this reason, weather and subsequent power production forecasts are vital to ensure energy security and decrease costs for grid maintenance.

To optimize its forecasts for power production variables, the German Weather Service (DWD) runs several research projects. One of these projects was ORKA, funded by the Federal Ministry for Economic Affairs and Energy. ORKA was a collaboration between the energy forecast provider energy and meteo systems, DWD and transmission system operators. As a result the COSMO-DE ensemble prediction system has been improved with focus on the requirements of the system operators. Since 2016, ORKA2 continues this work, adding the prediction of the current-carrying capacity to its aims. These forecasts are important for preventing cables from sagging due to high thermal load and optimizing the utilization of the transport net capacity.

The presentation will focus on recent developments of the COSMO-DE ensemble prediction system and their impact on renewable energy forecasts. These developments contain both modifications due to the general evolution of DWD's NWP system and additional measures designed mainly to improve the model skill with respect to forecast variables relevant for renewable energy.