



Combination of numerical weather prediction models and online measurement data for wind power forecasting using artificial intelligence methods

B. Lange, Ü. Cali, R. Jursa, K. Rohrig

Institut für Solare Energieversorgungstechnik e.V. (ISET), Kassel, Germany
(blange@iset.uni-kassel.de / Fax: +49 561 7295260)

In recent years, developments indicate that wind power is the strongest growing renewable energy source in the world. However, the integration of wind farms into the electricity grid has become an important challenge for the utilization and control of power plants in electric power systems, because of the fluctuating and intermittent behaviour of wind power generation. Wind power predictions improve the economical and technical integration of large capacities of wind energy into the existing electricity grid and are today an integral part of the electricity supply system in many countries.

The continuous growth in wind power capacity requires further improvements in the forecast accuracy to keep the integration cost for wind power low. With the results of different studies it will be shown that it is possible to maintain the trend of improved prediction accuracy:

- The effect of merging multiple numerical weather prediction models on the wind power prediction has been investigated. It has been shown that a combination of different NWP models improves the prediction accuracy.
- The combination of input from an Ensemble Prediction System (EPS), which is based on 75 ensemble members, is investigated in order to increase the accuracy of the existing wind power prediction system. The statistical results and prediction errors of these wind power predictions with different input combinations are compared with each other.
- For the wind power prediction algorithm different artificial intelligence meth-

ods like AAN and Nearest Neighbour Search have been compared. The methods have different advantages and drawbacks depending on the application considered.