



“Dark magic” wind power nowcasting/forecasting for semi-complex terrain using an artificial neural network and data mining framework

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With the increasing amount of renewable energy production reliable forecasts of the power production are needed to balance the load ingested into the electricity network. In regions with semi-complex and complex terrain reliable forecasts are still challenging. NWP forecasts provide a good hint on the expected wind power but are often not tailored enough and often not available early enough to provide forecasts for the nowcasting (0 – 6 hours) range. Artificial neural networks (ANN), using their “dark magic”, are able to digest the information of recent and historical information of observations and NWP forecasts. Using these tools for post-processing NWP forecast for the nowcasting range (and also day to days-ahead range) one can produce, once proper trained, tailored forecasts of expected wind power for the next hours.

An artificial neural network (ANN) is applied to forecast wind power and speed at different Austrian wind power sites and hub heights as well as meteorological observation sites, including high alpine sites as well as low-lands, for statistical reference. A set of different deterministic NWP models, such as the ALARO, the AROME and the ECMWF model, are used. The ANN performance is validated using cross-validation. Results show that they outperform the available NWP model forecasts and a simple regression model.