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Wind Energy Forecast Conditioned on Großwetterlage (large scale weather situation)

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Obtaining a quantitative measure for the uncertainty of forecasts for renewable energy has proven to be a challenging problem in the past. We present results on predicting uncertainty of a forecast conditioned on the large weather situation (Großwetterlage). As a first attempt, we use the objective weather classification by the German Meteorological Service (DWD), which sorts the weather into 40 situations based on wind direction, cyclonality and moisture in the atmosphere.

The considered forecasts concern the day-ahead production of solar power for two exemplary solar parks. To quantify the uncertainty, we define five different metrics (based on normalized absolute error and probability distribution), where each one is trained individually using machine learning. As a result, we obtain measures for over- and underprediction conditioned on the said Großwetterlage.

We consider this to be a very promising yet accessible approach to derive a quantitative measure for uncertainties based on the current, day-to-day weather situation. Future work may concern an improvement of the Großwetterlagencharacterization and a general, probabilistic formulation of the problem, e.g. using Bayesian inference.