EGU22-13481
https://doi.org/10.5194/egusphere-egu22-13481
EGU General Assembly 2022


# Improving 0-24 h offshore wind power forecasts over the Baltic Sea: comparing post-processing methods of varying complexity

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Accurately forecasting short-term wind power production is a challenging task. As the share of wind power in the electrical system is rapidly growing, this task is becoming increasingly important not only for power production companies but also for transmission system operators. By applying post-processing methods to forecasts of wind speed from numerical weather prediction (NWP) models, power production forecasts can be improved. In this study, we used two years of lidar measurements of the wind speed from a coastal site in the Baltic Sea to calculate a theoretical power production and evaluated forecasts from the NWP model HARMONIE-AROME. Six post-processing methods of varying degree of complexity were implemented and tested in order to mimic how they could be used operationally. The performance of the methods in different weather situations was analysed in terms of the mean absolute error (MAE) skill score. For the test period it was found that, in general, the simple method of temporally smoothing the wind speed forecast by applying a low-pass filter (moving average) with a window of ±1 h outperformed the other methods tested. The main reason for this being a reduced risk of double penalty due to small time shifts in wind speed variations in the forecast compared to the observations. However, under weak synoptic forcing the best skill score was achieved using a mix of the forecast from the previous and the current day. Additionally, when low-level jets were forecasted, the best result was achieved using the machine learning random forest algorithm.