Geoscientific
Model Development
Discussions

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Interactive
comment

Interactive comment on "Simulated wind farm wake sensitivity to configuration choices in the Weather Research and Forecasting model version 3.8.1" *by* Jessica M. Tomaszewski and Julie K. Lundquist

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General Comments: The paper is of great importance given the rapid increase in wind farm development. It is difficult to build a new wind farm without being influenced by wake effects from surrounding wind turbines. The open-source Weather Research and Forecast (WRF) model and coupled Wind Farm Parameterization (WFP) is a sophisticated numerical modeling tool for addressing the impact of wake effects. The paper's research findings provide a valuable WRF-WFP configuration template for both researchers and private industry to more accurately quantify the impact of wind farm

wake effects on regional wind resources. Increased modeling accuracy of potential wind power production reduces wind park cost uncertainty and contributes to the transition to more robust wind energy generation portfolios.

Minor comments: 1. The finest horizontal grid spacing included in the sensitivity study was 1 km. Why were finer resolutions not explored? Was it based on available computational resources or underlying physical limitations of the WFP? 2. One component of the sensitivity study was disabling TKE generation... was this accomplished via a WRF namelist setting or was the source code modified? 3. It may be useful to provide the eta levels used in the lower atmosphere to achieve 10 m vertical resolution in a Table as a reference for the modeling community. 4. Please discuss the choice of using 0.7 degree ERA-Interim initial / boundary condition data when higher resolution data sets (RUC/RAP/NAM) are available during the study period. My guess is the WRF parent domain (27 km) may be sufficiently north to be just outside the bounds of the mentioned data sets. 5. Ultimately, the accuracy of the WFP is limited by the WRF prediction skill of the background wind speed. The choice of model physics (PBL, LSM, surface layer) has been shown to have a significant impact on near surface wind prediction. Can you generally discuss how important choice of physics is relative to the WRF-WFP model configuration setup? As I understand it, the WFP only works with the MYNN 2.5 level PBL scheme, so I imagine that could be a limitation.

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