Wind Energ. Sci. Discuss., referee comment RC2
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Comment on wes-2021-106

Anonymous Referee #2

Referee comment on "Comparing and validating intra-farm and farm-to-farm wakes across different mesoscale and high-resolution wake models" by Jana Fischereit et al., Wind Energ. Sci. Discuss., https://doi.org/10.5194/wes-2021-106-RC2, 2021

Overall comment: This work compares and validates the intra-farm and farm-to-farm wakes across different mesoscale and wake models. I think the topic is certainly interesting and relevant to the wind energy community. In particular, I enjoy reading the part where the authors applied a filtering method to compare WRF with the engineering model. However, more details about that approach are needed. Overall, I think the paper can be accepted for publication after addressing the following comments.

- Line 8: It is weird to abbreviate Wind Farm Parametrization to FIT. Maybe rewrite to as Fitch scheme. That would make more sense.

- Lines 199-200; Lines 221-222, can the authors provide more detailed (or an example) about the “averaged weighted according to the WRF-NWF wind speed at the WRF inflow grid point” using information from Table 6? I am not sure what it really means. In addition, I thought only the WRF and SCADA data are subjected to filtering, does the simulations from wake models also undergo some kind of filtering as well based on the quoted sentence.

- Wind direction filtered (Table 6; lines 214-215): Since Rodsand II mast is largely influenced by the wake, I am not sure how valid is f2 for wind direction filter. Is there any coincide periods between f1 and f2?

- Lines 237-242: I think it stresses the value of the added TKE in the WFP. Authors could consider adding that in their discussion.

Reference:

Xia, G., Zhou, L., Minder, J.R. *et al.* Simulating impacts of real-world wind farms on land surface temperature using the WRF model: physical mechanisms. *Clim Dyn* **53,** 1723–1739 (2019). https://doi.org/10.1007/s00382-019-04725-0

Tomaszewski, J. M. and Lundquist, J. K.: Simulated wind farm wake sensitivity to configuration choices in the Weather Research and Forecasting model version 3.8.1, Geosci. Model Dev., 13, 2645–2662, https://doi.org/10.5194/gmd-13-2645-2020, 2020.

- Figure 9: There should be more spacing between the top and bottom panels to avoid confusion.

- Line 256: what about the results from RANS-ASL?

- Missing comma (eg., Line 299: In addition, the deficits are also narrower in south-north direction)