

Interactive comment on “Improving wind farm flow models by learning from operational data” by Johannes Schreiber et al.

Anonymous Referee #2

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In this manuscript, the authors propose a method to improve the calibration of wind farm models, specifically FLORIS in this work, by using power measurements of the wind turbines. After the introduction providing motivations for this work, the methodology is quickly summarized in Sect. 2. The method is then applied for two cases, namely a wind tunnel test with three turbine models and a real onshore wind farm on complex terrain.

I believe this work is highly relevant for the wind energy community and it presents some novel and interesting results. The “augmentation” of the model parameters is not a trivial problem and here is well presented and these preliminary results are convincing. My main criticism is about the organization of the paper. I believe that the methodology for the model calibration, which is currently described in Appendix A,

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should be moved to the main text body and merged with Sect. 2. I personally jumped from Sect. 2 to Appendix A, before reading Sect. 3, otherwise it was difficult for me to fully understand, for instance, the parameters provided in Table 2, the observability of the parameters, why the parameters suddenly become “orthogonal parameters” at L12 of page 14, what is the transformation matrix reported in Table 3 or the correlation coefficient matrix of Table 4. Therefore, my suggestion, in general, is to enhance the readability of this manuscript even for readers who are not experts on this kind of technique. More detailed comments are reported below.

1. P1L17, “This paper describes a new method to estimate turbine inflow within a wind farm.” This does not seem to be the objective of the work, at least not the main one.
2. P3L7, cross-check this sentence... “can help clarify” ...
3. P3L25, cross-check
4. P4L12, provide more details on how you calculate turbine thrust.
5. P6L28, can you provide a more detailed explanation of why this correction is performed with two Gaussian functions? Then, clarify if you mean sum or difference of these two functions, see Eq. 5.
6. P7L16, cross-check
7. P8L2, provide references for these aisle jets. Is this a new terminology or it has already been used in literature?
8. Table 1, please clarify how these initial parameters are estimated.
9. P13L5, the values of Cspeed should be provided in a non-dimensional form.
10. Table 2, how did you select these bound values?
11. P14L12, in the text is not clear how you switch from the actual model parameters to the orthogonal parameters. It becomes clear only after reading Appendix A.
12. P14L14, Similarly to the concept of observability.
13. P14L18, check on in Fig. 7
14. P15L18, check the new line

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