

General comments:

“Improvements to the Dynamic Wake Meandering Model by incorporating the turbulent Schmidt number” makes an important contribution to the wind energy community’s understanding of wake meandering. While the Dynamic Wake Meandering Model has conventionally treated the wake velocity deficit as a passive tracer advected by large-scale turbulent structures, the current manuscript addresses the shortcomings of this assumption. The connection with previous experiments indicating that momentum is transported less efficiently than scalars in turbulent wakes and the subsequent incorporation of the turbulent Schmidt number is insightful and significant for the implementation of low-cost wake prediction models. While the manuscript’s contribution is novel, it lacks clarity in some parts, particularly around the discussion of the benchmark in Section 3.2. Please see below for specific comments.

Specific comments:

1. Page 1, line 18: Is it worth mentioning the theory that wake meandering is caused by bluff body vortex shedding (e.g., Medici & Alfredsson 2006)?
2. Page 2, lines 41-43: This sentence is not very clear. The paper will discuss how *what* affects the predictions of the DWMM?
3. Page 3, line 53: Even though the small-scale turbulence part of the DWMM is not used in the current study, a very brief description of how the small-scale turbulence is modeled would be nice to provide a more complete summary of the DWMM.
4. Page 4, equation 8: Please explain here how the thrust coefficient is obtained.
5. Page 5, lines 111-112: The definitions of t and ΔT are not entirely clear. Is t the time the wake leaves the rotor plane or the time it reaches the downstream location where wake center position is predicted?
6. Page 8, lines 173-174: What averaging period is used for the SCADA data?
7. Page 8, lines 177-178: This line further contributes to my confusion about the definition of ΔT . Doesn’t ΔT depend on \bar{u}_a , per equation 13? Does that mean the low-pass filter threshold changes for each time period?
8. Pages 8-9, lines 178-179: What is the low-pass filter threshold in terms of D ?
9. Page 13, figure 6: It would be helpful to see the actual values for both plots in addition to the differences.
10. Page 19, section 3.2.1: What is the purpose of the extensive comparison between the observations and the benchmark? The differences discussed based on figure 12 were already described in the definition of the benchmark.
11. Page 19, lines 356-357: It’s hard to compare figures 13 and 12 when they are not next to each other. Could they even be plotted on the same plot?
12. Page 19, lines 359-361: If the benchmark doesn’t show the benefit of the non-passive DWMM, why is it included? Why not just compare directly with the observations?
13. Page 22, table 1: Can correlations with observations be shown in addition to (or instead of) correlations with the benchmark?

Technical corrections:

1. Page 5, line 122: Equation A2 is in appendix A, not B.
2. Page 15, line 277: Appendix B, not C.

References:

Medici, D., & Alfredsson, P. H. (2006). Measurements on a wind turbine wake: 3D effects and bluff body vortex shedding. *Wind Energy: An International Journal for Progress and Applications in Wind Power Conversion Technology*, 9(3), 219-236.