

Response to Anonymous Referee 1 comments of Manuscript ID WES-2022-5 entitled “FarmConners Wind Farm Flow Control Benchmark: Blind Test Results Part I”

Thank you for taking the time to review our article. We would, however, like to state that we find the excessive use of exclamation points (!) quite confusing in your comments and hope that you would still find them adequately addressed. Please also note that we have decided to divide the article into two, where Part I (the current form) consists of Blind Tests #1, #3 and #4 (field tests and LES comparisons); and Part II focuses on Blind Test #2 with the wind tunnel experiments.

1. The labels of the following figures is too small!!! Figures 3, 4, 6, 7, 9, 11, 12, 13, 16, 18, 19, 27, 30, 31, 32, A1, A2, A3, B1, B2, B3, B4, C1, C2
 - Figures 3, 4, 6, 7, 9 (regarding ‘methodology’): The axis labels are explicitly added to the captions to increase clarity.
 - Figures 11, 12, 13 and 27, 30, 31, 32, as well as A1, A2, A3, C1, C2 (regarding ‘results’: The font size for the axis labels are increased directly.
 - Figures 16, 18, 19 as well as B1, B2, B3, B4: Are now excluded from this article (Part I of the benchmark results), and transferred to the subsequent paper (Part II of the benchmark results).
2. Table 1: Instead of “x” put “name of the research institute / name of Code” Table 1 is put in the introduction to give a generic overview of how many participants have participated in the benchmark, and in which blind test. Indication of the name of the institute per participants in Table 1 would violate the anonymity, so it is avoided. For the indication of the models, the benchmark results show more details are needed. For example, many participants have used the same framework for the models (e.g., FLORIS) with different sub-modules and calibration procedures. This is highlighted in detail in Tables (now) 3, 8 and 9, where such information is provided per blind test.
3. Table 3: where is the difference between P4 and P5? Maybe write in the “Wake Model” line “Calibration1” and “Calibration2”

The difference between P4 and P5 are indeed in the calibration procedure (not just the wake model, but several other modules within the modelling framework, including the yaw loss parameters as highlighted later in the section). To further underline such differences, a few sentences are added before Table 3 reads as “However, it should be noted that seemingly identical model applied by the participants is likely to be calibrated differently, resulting in different performance in their predictions. This is further discussed in the detailed model descriptions per participants, and highlighted in the blind test results later in the section.”
4. Figure 3: Include SMV5 in the caption and Figure 4: Include SMV7 in the caption
Turbine numbering SMV1 – SM7 are all in x-axis of Figures 3 and 4. Now explicitly added to the caption.
5. Figure 3, Figure 4: what do the empty black circles represent?
They represent outliers of the boxplot - now added explicitly to the caption.
6. Figure 5a: diagram “WS”, caption “delta_WS”: correct one of them.
The caption is corrected.
7. Table 6: Describe the parameters “alpha”, “beta”, ..., “n”. Best, if also in the text!
It is out of scope to describe the parameterization of the participating models in detail. Rather, the benchmark focuses on the inference part of the existing (widely-used) models, including the calibration processes. However, before Table 6, the interested readers are now encouraged to “For further details on the description of model parameters, see (NREL, 2021). For further discussion on the significance of such parameterization, see e.g., (van Beek et al., 2021).”
8. Figure 9: Distinguish blue dot from green line (not both measurement)! And orange dot from red line!
They are indeed both. To clarify, now added to the caption ‘Solid lines are the binned average of the measurements and model results indicated as scatters.’
9. Figure 10: Lines too thick, not clearly visible! Make lines (symbols) smaller
Figure 10 is enlarged now.

10. Line 408: Why are the wind direction bins in the text $\pm 2.5^\circ$ and in Figure 12 the labels are by 2° ?
Figure 12 x-axis labels (left figure) are updated now.
11. Figure 12 left: Colours not always easy to distinguish, put symbols
Figure 12 left is updated with Participant IDs as markers now.
12. Figure 12: Why line plot (left) and bar diagram (red)? No added value! Same for Figure 13
For Figures 12 and 13, the line plot on the left is a ‘classical’ representation of the energy ratio and power gain as seen in literature. The box-plots on the right is argued to be a better representation of the distribution of the same quantities, including uncertainty levels to be expected.
13. Rewrite Lines 405 - 422 because concept is quite complex and not described enough. Especially rename term ” i -Test” because the naming is confusing! Give table with weights and explain concept much more detailed.
The description of the weights under Section 2.4.2 is now extended and P_i^{Test} is renamed as P_i^{WF} in equation 2.
14. Line 1000: give equivalent number of revolutions for 3600s simulation time
It is not clear how that is relevant to the rest of the blind test presented in the article. Accordingly the paragraph (now starts at line 677) is left unchanged. More information on the reference database for the TotalControl LES blind test, as well as the data itself, can be accessed via https://data.dtu.dk/articles/dataset/FarmConners_cnblz02e3m_rot90_WakeSteering/13414922.
15. Table 10: line for partner description
(Now Table 9) As stated earlier, the participant IDs are kept anonymous throughout the study. That was a pre-condition many participants have requested from the initial launch of the FarmConners benchmark.
16. Line 1089: make clear what is meant by subset! WT32, WT28 and WT29, WT25 or different? All turbines in the parc?
(Now line 767) Clarification added at the end of the sentence as “(2-turbines for single and 8-turbines for multiple wake analysis behind the controlled turbines WT29 and WT32 in Figure 19)”.
17. Line 1123,1124: 8-turbine subset have to be horizontal lines! WT32, WT25,..., WT1 are not in a row!
(Now line 800) The IDs of the first turbines in the rows are corrected.