

Authors' response to the editor's review of "Sensitivity analysis of wake steering optimisation for wind farm power maximisation"

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Main comment

The authors would like to thank the editor for the review of the paper. The authors' responses (in blue) to all comments (in black) are included in this document. Furthermore, following the detection and resolution of a software bug in the FLORIS framework, the related adjustments to the paper are also outlined below. All modifications are marked appropriately in the revised manuscript.

Minor changes:

1. L328, the statement "offers more physically accurate optimal yaw angles than the Gaussian model". The final accuracy of the model is out of the scope of the manuscript discussion (as already discussed with referees and indicated in the text, the paper is not about demonstrating which model is the best), and the statement is not supported by any external reference either. Maybe the sentence could be rephrased by considering that such model takes more physical effects into account, as stated in the previous paragraph in the manuscript, but without entering into accuracy discussions if you want to keep the stated scope.

The statement has been rephrased to avoid the model comparison in terms of accuracy.

2. L530, when referring to the nominal cases, maybe you mean Fig. 12-a,b,c.

Yes, thank you for spotting this. "d,e,f" has been replaced by "a,b,c".

Changes due to software bug:

The authors have identified and resolved a small bug in the published implementation of the FLORIS software version 2.4. The bug affected the GCH model, specifically the calculation of the effective yaw angles caused by secondary steering effects in negative yaw conditions. The FLORIS developer team has been notified (issue number 684), and the authors expect a resolution of the issue, which consists of a simple sign switch, from negative to positive, in the upcoming weeks.

In light of this, Figures 4 to 12 have been updated by incorporating the corrected results for the GCH model. All other presented results remain unaffected. Additionally, the references in the manuscript text regarding specific resulting values, such as farm power improvements, have been appropriately

updated. The main outcomes of the manuscript are the same. Please refer to the point below for more detailed information about the manuscript changes.

- Following the software correction, the farm power function for the GCH model exhibits high gradients rather than discontinuities. The discontinuities for this model were produced as a result of this bug. The authors found these discontinuities surprising and, in the reviewed submission, tried to provide an explanation to the reader. Such an explanation (which was provided in Figure 7) is no longer needed and has been removed. The authors have also revised the manuscript by replacing the term “discontinuities” with “high gradients” when referring to the GCH model. Note finally that the bug was only marginally affecting the power output of a wind turbine. The authors have re-run all experiments and have updated all modified values in the manuscript.
- The authors have updated Figure 5 with an initial condition “Test Case 1” that most faithfully highlights the optimal yaw angle dependency on initial yaw angles for the GCH model. The discussion of the presented results remains essentially unchanged. The initialisation condition is still shared among all models and is included in the statistical analysis of Section 4.2.3.
- As a result of the previous point, the planar slices through the objective function shown in Figure 6 exhibit slight variations due to the different optimal solutions for “Test Case 1”. Furthermore, Figures 6-d and 6-h no longer show discontinuities for the GCH model.
- The authors have observed that negative signs in optimal yaw angles have a slightly greater influence on the initialisation sensitivity of the GCH model. While this behaviour is already mentioned and explained in the manuscript, the authors have further clarified it as one of the leading causes of GCH initialization sensitivity, along with column-wise sign switches in optimal yaw angles.