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WIND ENERGY SCIENCE DISCUSSIONS

Interactive comment on "Surrogate based aeroelastic design optimization of tip extensions on a modern 10MW wind turbine" *by* Thanasis Barlas et al.

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The authors would like to thank the reviewer for their time and greatly appreciate their feedback and suggestions to improve the article.

- Title and general content: From the authors point of view the focus of the article is not on the evaluation of the optimization method but on its application to a realistic design problem. Moreover, the authors believe that the title accurately represents the work presented in the manuscript.

- Simulation case choice: One main assumption in the choice of the single simulation

case is that it is representative of the ultimate design loads of interest. This is indeed the case for the baseline design. The 600s ETM simulation ensures that a range of inflow and operating conditions is accounted for. Moreover, different turbulence intensities are simulated in the last part of the article together with full wind speed range power curves for the AEP evaluation. The authors agree that a full DLB would be preferable, but the load simulation cases have been kept to a minimum for a fast and robust optimization setup.

- Tip parametrization: The limits of the tip geometry design space are chosen based on practical constraints (monotonically decreasing chord, realistically added tip length), model range of validity (in/out-of plane offsets), and targeted power/load capability (in/out-of-plane offsets and twist signs). The authors agree that the chosen design space limits are crucial for the optimization directions, but it would not have been practical to include all prior parametric studies in this article. Some references to prior relevant work have been added.

- Surrogate model choices: The chosen DOE and surrogate model methods were based on the cited literature connected to the utilized SBO library. The number of initial sample points in the DOE was in accordance to the model requirements and the chosen methods. The authors believe that the focus of this work is not on the evaluation of the best optimization methods but on the evaluation of the potential design benefit of the chosen methods.

- L121,124, 149: The sentences have been rephrased.

- Fig12: The benefit of such a design is to increase power extraction in below rated operation within the load constraints. The power in rated conditions is regulated by the controller to the rated power setpoint.

- Results section: The authors believe that all the information about the simulated load cases is included in the paper, so the results are easily reproducible. Following the reviewers comments, a time series comparison of the blade root moment between the baseline and the optimized model has been added.

- L227: The authors believe that the claim for reduced LCOE of such a design concept is realistically valid. This work has been carried out in connection with industrial partners with the targeted business case being very realistic. In that sense the lifetime impact (fatigue loads) of the concept is not driving the design, although a full DLB evaluation is of course necessary for such a concept evaluation.

- Abbreviations: The missing abbreviations have been added.

The changes will appear in the revised manuscript.

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