

Interactive comment on “Performance study of the QuLAF pre-design model for a 10MW floating wind turbine” by Freddy J. Madsen et al.

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Referee 1 - Anonymous

The authors thank the referee for the suggestions, comments and insights, which has led to improvement of the paper. Please find below the referee’s comments (RC), the corresponding [author’s comments \(AC\)](#) and the [changes in the manuscript](#). PXLX refers to page X and line Y in the revised manuscript, see the attached pdf-file under the Supplement tab.

RC: The paper clearly shows that QuLAF can either under-predict or over-predict

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the results from FAST, and can sometimes match them perfectly through a favorable combination of discrepancies. For example, the authors show that for DLC1.6, a perfect match between the two models in tower base bending moments is obtained. However, this perfect match results from opposite discrepancies which cancel one another. In such a case, the reliability of the approach can be questionable as a good result is obtained for “bad reasons”. Although the tool is of course intended for use in a pre-design phase, it would be useful if the authors could elaborate more on the reliability/repeatability of such results for different conditions and design types.

AC: Agree. The shortcomings of the QuLAF model observed for wave-dominated or wind-dominated situations are sometimes cancelling each other when combined wind and waves are applied (as in DLC1.6) for the present floater. We have updated the text to make it clearer and to emphasize this cancellation effect (see P12L10). The authors also point out that this “lucky” cancellation effect is no specific to this model only, but it can also show when e.g. comparing state-of-the-art numerical results to experimental measurements.

RC: Additionally, the QuLAF approach is restricted to 2D analyses with aligned wind and waves. It also models different physics than FAST (e.g. the mooring system in FAST introduces different sources of damping). More insights could be given on how these assumptions are likely to affect the accuracy and reliability of the results for different designs.

AC: The model is meant to complement existing state-of-the-art tools, giving a preliminary quick overview of the response and loads for a wide range of environmental conditions. After this preliminary screening, the time-domain model should be used to analyze in more detail specific load cases - e.g. cases with extreme loads or transient events (see P3L22-24 and P32L16-22). We have included a sentence on mooring in

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P4L20.

RC: P. 4 L. 27: An estimation of how much faster QuLAF is compared to FAST could be valuable.

AC: We agree that this information would be valuable for the paper. We have added a comment on P4L4 regarding the computational times.

Please note that other minor changes have been introduced in the text to improve readability and fix a few typos.

Please also note the supplement to this comment:

<https://www.wind-energ-sci-discuss.net/wes-2019-20/wes-2019-20-AC1-supplement.pdf>

Interactive comment on Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2019-20>, 2019.

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