

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 2 – Maurizio Collu

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](#). PXY refers to page X and line Y in the revised manuscript, see the attached pdf-file under the Supplement tab.

RC: The only main comment I have is the following: precise quantitative differences

C1

between the results obtained in FAST and QuLAF are presented, but they are qualitatively classified as "good", "acceptable", and so on. It is not clear to me what is the criterion utilised to judge the goodness of the results, i.e. what would be the "unsuitable/acceptable/good/very good" thresholds (i.e. 30%/25%/10%/5%? Different for different parameters?), based on state-of-the-art industry experience. I can appreciate that it is always difficult to have some precise numbers, but since this work has been carried out as part of the EU project Lifes50 I wonder if the authors could add a discussion regarding this aspect, taking advantage of the close collaboration with some of the main FOWT support structure designers during the project.

[AC: We agree with the referee that it was not very clear. Effort has now been put into streamlining the classifications of the results – utilizing: 0-5% \(very good\), 5-10% \(good\), 10-15% \(fairly good\) and 15-20% disagree. We have updated the results discussions in section 5. Our general comprehension is that in the pre-design phase you can accept lower accuracy just that the trends are right.](#)

RC: Pag.6, line 19: "Six different wind and wave seeds were simulated for each environmental condition" and, later "a simulation time of 5400s with the same length of turbulent wind field was used for all the load cases including 1800s run-in-time to remove any transient response in the time-domain model". Does it mean that transient (1800) + 6 x 10 minutes simulations (each one with a different wind and wave seeds) have been adopted?

[AC: We did not carry out any 10 min simulations. Each simulation of 90min \(30min transient\) is done for a specific peak period, wind/wave seed and mean wind speed, i.e. \(7 wind speeds x 3 peak periods x 6 seeds\) x 5400s. We have extended Table 3 on page 7 to include number of simulations per load.](#)

C2

RC: Pag.14, line 11: "The deviation levels in Table 8 are of the same magnitude and the reason for this is that only maximum values have been considered in the table. This might not be representative for this transient load case, where also the negative values have high influence, as can be seen in the left column of Figure 6." Would it be possible to add a table relative to the max (in module) negative values, and discuss these as done for the max (in module) positive values?

AC: We agree and thank the referee for the comment. We have extended Table 8, page 15, the discussion and included Figure 7, page 16 with time series to clarify.

RC: Pag.2, line 7: "especially if they are carried out with time-domain numerical tools simulating at real-time CPU speed". Please clarify what it is meant by "at real-time CPU speed", indicating the simulated-to-simulation time ratio.

AC: Yes, by "real-time CPU" we mean a simulated-to-simulation time ratio of 1. We have updated the text, see P2L8.

RC: Pag.2, line 10: "when the concept design is more converged", please re-phrase, not very clear.

AC: We changed "converged" to "refined" (P2L11).

RC: Pag.10, caption of Table 5, please re-phrase expanding it (at the moment a bit difficult to understand).

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AC: We agree. We changed all the captions of the result-tables to make it more clear (Table 5-9).

RC: Pag.15: "The simulations consists of 18 realizations (i.e. six seeds)" How long each simulation? Would it be possible to summarise the info below, adding them as additional columns on the right in Table 5? - Length of simulation - Timestep of integration - Number of seeds (and how many minutes for each seed).

AC: We thank the referee for the suggestion. We have adapted the idea into Table 5.

RC: Fig.9 The names of the load cases seem to be the names of the files used – i.e. not very clear. Furthermore, some of them are cut, and in general very small to be read. It is more important to highlight the fact that FAST and QuLAF agree or disagree on the load case ranking, than the specific name of the load case.

AC: The figure was indeed not very clear. We have changed the layout and labelling of the bars on Figure 10, page 20 so it is easier to read. As the reviewer writes, the reason for having this figure is to highlight the agreement or disagreement on the load case ranking.

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:

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<https://www.wind-energ-sci-discuss.net/wes-2019-20/wes-2019-20-AC2-supplement.pdf>

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