

Review of Manuscript wes-2023-21

Title

On the characteristics of the wake of a wind turbine undergoing large motions caused by a floating structure: an insight based on experiments and multi-fidelity simulations from the OC6 Phase III Project

Authors: Cioni, Stefano et al. (more than 30)

Summary as understood by the referee:

This manuscript discusses findings from a co-operational project investigating the ability of simulation methods to reproduce the measured wake behaviour of a model wind turbine subjected by “large” movement as are seen, for example in floating off-shore wind-turbines.

This paper is important as it compares mainly vorticial methods (assumed to be fully inviscid) and RANS-CFD (includes viscosity driven effects as e.g. turbulence).

Major:

Please give a clear definition how “vortex core” is defined (usually where $u_{\phi} \sim r$ ends)

Lines 165 ff: I do not fully understand of AOA, a etc. refers to the tip only or to a unspecified location on the blade. Please improve.

Line 252: “blockage ratio”. Is it an area-based number? Please clarify. If so, 8% is indeed a (too?) large value.

Line 391 (Figure 4) It is a pity that the ω scales are not identical. Consider to make them equal (min = -100?).

Line 458: (Figure 6 right) consider y-scale to start at 0.7 instead of 0. This would male the differences clearer. Why are there no result from SJTU?

Also, I STRONGLY advice to add ERROR bars to ALL experimental values! This is very important for quantification of meaning of differences from the various simulations.

Lines 280 ff (section 4). Description of CFD models should include mesh size und turbulence models used and if both were varied to estimate the effect on accuracy

Line 502: Please explain in more detail HOW “the effect of blockage” was considered.

In summary, the authors should be more courageous and draw even stronger conclusions, if possible.

Minor:

I wonder if the “large” in the title (and elsewhere) isn’t too un-determined.

“OC6”. I wonder, if IEAwind Task 30 should be added or a more detailed explanation of the abbreviation.

Line 21: typo: Shangai -> Shanghai

Line 874 (and probably also elsewhere) change “good agreement” to “agreement of xx % or so. As I always say: “good” and “bad” are terms for fairy-tales not from science.