

Interactive comment on “Wind turbines in atmospheric flow – FSI simulations with hybrid LES-IDDES turbulence modelling” by Christian Grinderslev et al.

Anonymous Referee #2

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General comments.

The manuscript presents high fidelity rotor-resolved numerical simulations under neutral atmospheric conditions. A new hybrid turbulence model between is presented and results are compared to the use of IDDES only. Simulations are performed for both rigid and flexible blades. The work is very interesting and highly relevant to the field. The manuscript is well-written and rather complete. The referee thinks the paper can be accepted for publication after minor revisions, see below.

Specific comments.

- Neutral conditions are considered here. The authors mention the fact that stratification should also be done as future work and is likely to impact on the outcome of the turbulence model. The manuscript would benefit from more explanations about this, including the challenges of modelling stable and unstable conditions with the presented CFD model.

- Some information on the model settings are missing for the reader to fully reproduce these simulations (or at least not obviously presented). Please make sure all the input parameters (e.g. of the turbulence model, blade structural parameters) are specified in the text, in an appendix if needed. The overall Reynolds number could also be mentioned in the text.

- L260: In this study, the LES length scale is fixed to the background mesh so that it doesn't change with mesh refinement. Can you comment on the impact that this has on the cut-off of scales, e.g. in the turbulent kinetic energy spectrum?

- Tower and nacelle are omitted from the CFD results but they will impact on the near wake. Please comment on this.

- L326: Can you specify more precisely at what distance the hole of the disc mesh should be from the surface?

- L340: 1000sec are considered for the post-processing, Can you add also the corresponding time period in rotor revolutions?

- Adding details of the computational cost (resources used) would be useful.

- Minor corrections.

- L122: word "for" is duplicated

- L170: equal -> equal to