

## ***Interactive comment on “Aero-elastic analysis of wind turbines under turbulent inflow conditions” by Giorgia Guma et al.***

**David Verelst (Referee)**

dave@dtu.dk

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Please note that my expertise area is within hydro-servo-aero-elastic load computations and as such I can't comment on the CFD methodology.

Additional comments can be found in the attached PDF as notes. This abstract needs additional attention regarding language and grammar, I have marked some grammatical incorrect sentences in the attached PDF.

### **General**

If I understood your work correctly, you have performed an FSI study with various modelling approaches, from a "simple" blade (no turbine present) to the full complexity of the turbine (with tower, shear, turbulent inflow). You have used a model of the

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DANAERO turbine. You conclude that the considered model fidelities affect the loading and consequently fatigue computations.

Why have you conducted this study with CFD, and not just simple BEM? Would you expect the conclusions you have drawn to be significantly different? You could consider adding BEM computations to many of the cases you have considered, and I think this could add something of value to the paper.

Please consider finding a better balance between literately describing what happens in the plots, and adding more discussions regarding what is physically happening in the different modelling scenarios.

### **2.3.1 Structural model**

Did you verify the structural eigenfrequencies and damping match the experimental setup of the DANAERO turbine? Will be relevant for the fatigue response.

### **3.1 Aeroelastic effects**

Could you indicate more explicitly what the aim of this section is? I assume its purpose is to validate the model?

Can you elaborate on the challenges when comparing turbulent measurements with simulations using deterministic inflow?

### **3.2 DEL Analysis**

It is not clear to me how you have performed the analysis:

- According to section 2.4 on the first paragraph of page 6, you computed 6 revolutions for BMU and 10 for the other cases (FMU/FMT). That means you have a different simulation length, how did you account for that?
- Why are using a reference number of cycles of  $N_{eq}=1e5$  while your time series are that short? Wouldn't it make more sense to compute a 1Hz equivalent load?

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- In Figure 18 you clearly show that the binning of the cycle counts is very different. Can you comment on that?

Please also note the supplement to this comment:

<https://www.wind-energ-sci-discuss.net/wes-2020-22/wes-2020-22-RC2-supplement.pdf>

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Interactive comment on Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2020-22>, 2020.