

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

## **Anonymous Referee #1**

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Interesting paper discussing the effect of flexibility and inflow turbulence on aero-elastic behavior. Impressive simulations with CFD coupled to a MBD code.

### General comments

- English language (especially sentence constructions) to be checked by native speaker
- The impact of different CFD modeling (BMU vs RMU) on results is very useful. However can some of the main conclusions on the influence of flexibility and turbulence also be achieved with lower fidelity aerodynamic models like BEM (i.e. is CFD really needed to arrive at the conclusions given)? And to what extent are these conclusions trivial rather than new insights? As the results are now based on only 1 operational condition, can these be generalized? Perhaps BEM simulations can aid to obtain re-

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sults for a larger operational regime?

Specific comments

-p5 2.2.1 Line 111 Not clear what SIMBEAM means

-p5 2.3.1 Fig. 2 This seems more a high level visualization of the model rather than showing details

-p6 2.4 Table 1 Perhaps good to signify coupled and rigid in this table as well? E.g. although FMU is said to have flexible components later on in the paper also FMU-rigid pops up.

-89 3.1.1 Line 172 Not sure if I understand. Observing Fig. 5a shows a minimum at approx 280deg which is more than 20deg past 180deg??

-89 3.1.1 Line 179 This explanation would be placed better somewhere at the start of this section when fig. 5 is firstly introduced.

-p9 3.1.1 Fig 5 If we focus on the effect of different aerodynamic modeling on temporal variations, why not also show time variation of aerodynamic variables (e.g. blade root moments integrated from pressures) rather than only deformations?

-p9 3.1.1 Fig 5 Why not show a 360deg range to focus better? (also holds for several other figures)

-p9 3.1.1 Line 187 Add 'Figure' between 'in' and '6'

-p9 3.1.1 Fig 7 Indicate in caption we are looking at time averaged forces

-p10 3.1.2 Line 207 Not really clear what text aforementioned relates to

-p11 3.1.2 Line 213 Is the reason for the 6% decrease in decay clarified (what is meant exactly with decay here, would deformation not lead to a smaller distance to the tower and larger tower effect)?

-p15 3.1 Line 258 Add 'Figure' between 'see' and '9'. Is the reference to figure 9 correct?

-p15 3.1 Line 266/267 Not sure if I observe an  $F_y$  shape change between 30%-70% in Figure 16?

-p17 4 Line 294 Probably 'larger' instead of 'major' is meant (also in abstract). It is not clear from the sentence which effect is meant exactly (fatigue loads of  $M_y$ ?).

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