

Wind Energ. Sci. Discuss., referee comment RC1
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Review of WES paper.

Anonymous Referee #1

Referee comment on "Vertical wake deflection for floating wind turbines by differential ballast control" by Emmanouil M. Nanos et al., Wind Energ. Sci. Discuss.,
<https://doi.org/10.5194/wes-2021-79-RC1>, 2021

-----General Comments:

Overall a very interesting and in-depth paper on the topic vertical wake deflection using the extra capabilities of a floating wind turbine. The necessity for the research is well explained and a clear literature research is conducted. The research is very thorough and provides a good insight in all the aspects related to the vertical wake deflection. I think it is also a nice showcase of the extra possibilities for floating wind farms. The paper as is I would accept, I just have a few comments/questions.

-----Specific Comments:

- In figure 4 the percent error is shown. Is this a time average error or is the data from a single time shot. It might also be nice to use a different scale, the main percentual range looks between 0-10%. That way the differences might become more apparent.

- For equation 2, I find it difficult to understand the "rate" aspect of this equation. As it is defined it shows how much "more" wind there is at each distance downstream, but I wouldn't say it is a measure of how quickly the wake is recovering, only by how much it has recovered. As it is now the word "rate" throws me of a bit.

- At line 232 it is noted that as the power decreases due to the tilt, the wake intensity also decreases which in it of itself already provides higher windspeeds. Would it be possible to discern how much of the power gain for the second turbine comes from the wake redirection and how much from the fact less power is extracted from the incoming wind?

- A (maybe naive) question I have in general is how far (in terms of angle) is the turbine platform combination from tipping over. Could such a scenario exist with a sudden drop in wind speed/thrust force or an onset of large waves, especially if the variation in wind or waves is faster than the pumping system.

-----Technical Comments:

I only found 3 small technical points:

- On page 16, line 279 it says: ...rotor to a slightly faster **of** slower wind speed. I think it should be or?

- On the same page, I get the impression that the labels in figure 13b are mixed up (or the bars). The percentages mentioned in the text for the cluster power match the bars with the Upstream xlabel and vice versa for cluster.

All in all a very interesting paper.