Reviewer's comments to manuscript no. WES-2021-60

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Full title: Parked and Operating Loads Analysis in the Aerodynamic Design of Multi-megawatt-scale Floating Vertical Axis Wind Turbines

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The manuscript deals with the analysis of multi-megawatt-scale floating Darrieus-type vertical axis wind turbines. Both parked and operating conditions are evaluated by means of performance (i.e., power extraction) and rotor-averaged aerodynamic loads. A 3D vortex model was used to perform the simulations. Different design configurations were analyzed, with variations in number of blades, aspect ratios (ratios of rotor height and diameter), and blade tapering towards the blade ends. During the design variations with respect to the number of blades and aspect ratios, the authors took care not to modify the rotor solidity and Reynolds numbers, which yields clear conclusions that are affected by one parameter only and not a mixture of parameters as was done by other authors before.

General Comments

The manuscript is generally written in a clear and concise manner and well organized. The ideas and messages are clearly formulated and the overall story-telling is very good. Here and there, a nice systems engineering view shines through that is very appealing. The topic of the manuscript is generally relevant for the wind energy research community. The methods for the description of the turbine aerodynamics are appropriate for a design space analysis. The results are interesting and allow for clear conclusions provided at the end of the manuscript. There are just a few specific comments and technical corrections that should be addressed before final acceptance of the manuscript, which are given below.

Specific Comments

In the introduction, there are a number of self-citations which yields the impression that there are no other research groups working in the field of vertical axis wind turbines. The authors may find additional references to broaden the view on available literature. Also, the authors state that "various floating VAWT concepts have been proposed" (p. 2, l. 36), but give only two examples. The authors may give additional references to existing concepts.

The authors evaluate loads in a rotor-averaged manner, i.e., rotor thrust and lateral forces are analyzed. It would be interesting to see the difference in local loads on the blades depending on the variation of design parameters, e.g., by means of blade root bending moments. A respective extension would be appreciated, as it would allow for implications for structural blade design, which in turn would also underline the systems engineering view visible in some parts of the manuscript.

On page 12, at the end of the first paragraph, the authors list the simplifications and limitations of the model applied for the calculation of standstill situations, which is good. However, these seem quite numerous, and it is not entirely clear enough why they have been included. The authors should thus elaborate on the necessity to consider the simplifications.

The argumentation on page 12, 3rd paragraph, is weak. What differences in the overall theory behind the calculation of parked loads are the reason for the differences in the overall shape of the profiles? Please be more specific.

Technical Corrections

Please avoid unnecessary abbreviations in the abstract (N, AR, H, D). The authors should further consider restructuring section 2. Subsections and subsubsections may not be necessary, if there is only one subsection and subsubsection.