Response to reviewers of wes-2020-120

Markus Sommerfeld

June 4, 2023

Author response

Dear editor,
Thank you very much for your helpful comments and proposed changes to our manuscript, "Impact of offshore and onshore wind profiles on ground generation airborne wind energy system performance", wes-2020-120. We hope that this document will satisfy your standards.
Most of the requested changes could be implemented. Additionally, some figures have been edited and an additional figure to visualize the rotation of the wind vecotr has been added.
Sincerely, Markus Sommerfeld

0.1 Specific comments

I implemented most of the comments. Below you find comments on those I did not or could not implement.

- did not change ε with β. β is used for the kite's sideslip angle.

- Regarding Fig 6 +7, wind profile cluster: It would be interesting to relate your analysis to the one of Schelbergen et al (2020) who used very similar locations, in the Netherlands, so not too far away. What are the similarities and what are the differences between the two offshore/onshore resource assessments, both based on k-means clustering and similar number of clusters.

  - This would be interesting, but it is beyond the scope of this paper. I am not able to implement this within my available time

- No idea what you mean by "omnidirectional operation".

  - This refers to the fact that the device is able to operate under wind from any direction, i.e. operation is not restricted to a certain direction.

- Why equal tether drag distribution leads to underestimation of drag at kite? You can explain in very few words and do not need a referemce. You can leave the reference in place (never hurts) but if you can explain somethin with a few words then do so.

  - not implemented.

- why not using a function defined in two regions to approximate cl_L?, a linear function (for the lower alpha range) and a quadratic function (for the upper alpha range. At the point of connection, both functions should have the same value (continuous) and the same derivative (differentiable).

  - That would be a possible alternative, but was not implemented in the simulation (5 years ago)

- Better explain U_ref and z_ref.

  - I hope I did?

- Better explain a priori guess

  - I hope I did?
  - this a priori guess was used to select the wind velocity profiles from the clustered dataset and then kept through the study.

- What is "instantaneous performance" in the OCP context? How do you investigate this?

  - it's the timeseries results, e.g. tether tension or power during the simulated pumping cycle.

- Can you add a scale to the map?

  - I tried, but couldn't make the old code work. I hope the longitude and latitude labels on the abscissa and ordinate will suffice.

References