

***Interactive comment on “Improving mid-altitude mesoscale wind speed forecasts using LiDAR-based observation nudging for AirborneWind Energy Systems” by Markus Sommerfeld et al.***

**Markus Sommerfeld et al.**

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Dear Dr. Bechtle,

Thank you very much for your helpful comments to our manuscript, “Improving mesoscale wind speed forecasts using LiDAR-based observation nudging for Airborne Wind Energy Systems”, wes-2019-7. We have clarified the definition of RMSE and added additional reference to technical document describing the LiDAR uncertainty. Following are our replies to your comments and a description of modification to the manuscript.

Changes are highlighted in the “Supplementary Material” pdf. Text and figures marked in red were removed from the original submission and replaced by text and figures marked in blue. Following are our replies to your comments and a description of modification to the manuscript.

Sincerely,  
Markus Sommerfeld

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## Comments by the Referee

### 0.1 General comments

*Dear Authors, congratulations for your very interesting and important analysis. I read the paper with great interest. I have one or two questions about the methods which lead to Fig. 3.*

*First, I am unsure about what you mean by "The continuous line in the left sub-figure represents the Root Mean Square Error (RMSE) of wind speed." This is just a question for clarification... The RMS of what? is it a measure of the temporal variation of the measured or simulated wind speed on its own within some interval? Or an estimate of the precision of simulation or measurement (and if that, how is that uncertainty derived)? Or an RMS of a difference between different quantities? I think the paper would profit if you could explain this in more detail.*

- A clearer definition of wind speed RMSE, which quantifies the error between LiDAR measurements and WRF simulations, has been added to the paper.

*The other question, which maybe is connected to the first question, is about the uncertainty. Your measurement itself is subject to an uncertainty, and it would be interesting if that would be clearly described.*

*Thank you very much! Philip Bechtle*

- We have added a reference to a technical report verifying the performance of the used LiDAR ([https://www.woodgroup.com/\\_\\_data/assets/pdf\\_file/0023/15692/report\\_Sgurr\\_C3](https://www.woodgroup.com/__data/assets/pdf_file/0023/15692/report_Sgurr_C3)

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20130529\_FINAL1.pdf). Further information can be found in our previous paper "LiDAR based characterization of mid altitude wind conditions for airborne wind energy systems" (<https://doi.org/10.1002/we.2343>).

Please also note the supplement to this comment:

<https://www.wind-energ-sci-discuss.net/wes-2019-7/wes-2019-7-AC3-supplement.pdf>

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Interactive comment on Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2019-7>, 2019.