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Interactive comment

Interactive comment on "Wind speed deviations in complex terrain" *by* Christian Ingenhorst et al.

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We want to thank Anonymous Referee #1 for his comments and the time taken to read our manuscript.

Major remarks:

1. **"The title is not concrete and very broad and does not cover what is discussed in the paper precisely."**
   The authors agree with Anonymous Referee #1. The title might have led to wrong expectations and will therefore be changed in "Method for airborne measurement of the spatial wind speed distribution above complex terrain"

2. **"Research questions: the paper lacks a clear and well-posed research question, or questions and sub questions. As such also the conclusion**

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Discussion paper

is rather generally formulated."
Within the paper, research questions have been presented in form of two specific challenges (lines 54-62) towards an airborne measurement system to investigate the distribution of mean wind speeds above complex terrain. The conclusion concerning the second presented challenge (separation of temporal and spatial effects) will be further refined for the final paper.

3. **"Methodology: The title suggests this paper is about wind speed deviations/variability. So I do not understand why the paper does not show spectra or wavelet analysis"**
Due to the former, misleading title, the authors understand the expectations of Anonymous Referee #1. Within this paper, we are focusing on the distribution of mean wind speeds at specific positions above complex terrain. 'Deviations' were therefore meant in the spatial and not in the temporal manner. With our application in mind (site evaluation for wind farms) and taking into account the current status of the method, spectral and wavelet analyses are considered to be outside the scope of this paper.

4. **"Discussion: the paper also lacks a discussion section that reflects on the strengths and weaknesses of the study, and overall also put the work in context with other studies. Only then the paper can show how it extends the existing knowledge. "**
Strengths and weaknesses of the airborne measurement system have not been discussed within a specific section, but qualitatively throughout the complete paper, for example in context to CFD simulations as well as state-of-the-art measurement equipment. The authors agree, that the paper will benefit from a more detailed assessment of the method at the results chapter, pointing out strengths and weaknesses in a context of other studies. However, the current status of the project does not yet allow a quantitative in-depth validation of the method, which will be part of future publications.

"Also the paper misses a discussion about the representativeness of the atmospheric conditions that were studied."
The wind speed distribution within this paper is a result of a single, short term (approx. 2hrs) measurement campaign and serves as a proof of concept for the presented method. It is assumed to be representative for the prevailing atmospheric conditions during the campaign, but not for any different weather situations. Therefore, representativeness of the atmospheric conditions was not discussed in detail.

5. **"Figures: the paper contains far too many figures. 24 figures is a bizar number, and many of these figures are not essential. Figures 5 and 10 can be removed. I also find that the left panels of figs 6-9 and 11-18 of very limited value, since they are also not much discussed. Figure captions are also not mature and panels have not been labelled a) and b)."**
Figure 5 was considered to be necessary to enable the reader to evaluate the test conditions. Figure 10 will be removed. The authors agree that figures 6-9, 11-14 and 15-18 could be further reduced to an exemplary plot for each of the following comparisons:

   - UAV wind speed measurement to low level anemometer measurement
   - UAV wind speed measurement to met mast measurement,
   - UAV wind direction measurement to met mast measurement

   The left panels (time plots) are considered to be helpful for plausibility, also allowing to point out special events like pilot interaction within the measurement data. Panels will be labelled a) and b) within the final paper.

Minor remarks:

- "Ln 7: “huge”: hyperbolic, should be avoided"
  Will be changed to ‘relevant’
- "Ln 50: USA: not defined"
  It’s already defined in Ln 44
- Typos in Ln 95, 168, 169 and 201 will be corrected within the final paper.

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