

Response to Reviewers - Round 2

Reviewer 1

Dear Jacob Mann,

We sincerely thank you for your careful second-round review of our manuscript and for your constructive suggestions. We appreciate the time and effort you have devoted to improving the quality and clarity of our work. We have revised the manuscript accordingly and provide below a point-by-point response to your remaining comment. Your comment is shown in black, and our response is shown in blue. All corresponding changes in the manuscript have been implemented as requested by the journal.

Technical comment

I would still suggest a few changes to:

- Table 2: $|\text{MRBE}| \rightarrow \text{MRBE}$ and changes in the corresponding numbers.
- Fig 8: $|\text{MRBE}| \rightarrow \text{MRBE}$.

Response: We have modified Table 2 (p. 16) and Fig. 8 (p. 17) as suggested. The notation $|\text{MRBE}|$ has been replaced by MRBE , and the corresponding values have been updated to reflect the signed metric. The related descriptions in the Results section have also been revised accordingly to ensure consistency between the text, the table, and the figure. p. 17, l. 325-338

Reviewer 2

Thiébaud et al. present an interesting study on turbulence measurements with profiling lidar. The idea to place two lidars with a yaw angle offset and combining them to a lidar with more beams is interesting and innovative. The plots are well prepared and the manuscript is well written. The authors have responded to all comments, removed those parts which were not clear and completely justified based on the data. The discussion and conclusion is now much more balanced and focused on the results which are clearly based on the data. I recommend the manuscript to be published. I only have some minor technical comments that i list below.

Technical comments

Comment 1: Fig.2. It is great to have the wind statistics here now. Please put the measurement height in the caption and Sect. 2.1 already. It only appears in the next section and is quite crucial to interpret the numbers.

Response: The measurement height is now clearly stated in Sect. 2.1 (p. 4, l. 104) and in the caption of Fig. 2 (p. 5). All results presented in this study are based on measurements at 40 m above the mast platform.

Comment 2: p.9, l.179: You introduced the angle brackets for temporal averaging but do not use it in the equations any more.

Response: The angle-bracket notation for temporal averaging has been removed, and the mean quantities are now described directly in the text. p. 9, l. 180-181.

Comment 3: p.18, ll.384ff: At your site, you do not expect such spatial variability in the flow, so you expect the difference between the variance and the traditional method to be bigger at other sites. I think it is worth to explicitly mention that, although it is quite clear implicitly.

Response: We now explicitly note in the manuscript that the present offshore site is characterized by relatively homogeneous flow conditions. Consequently, the differences between the variance and traditional methods observed here likely represent a lower bound, and larger discrepancies may be expected at sites with stronger spatial variability. p. 19, l. 392-394.

Comment 4: p.20, l.424f: the statement about simultaneous multi-beam systems is a little bit repetitive to the last paragraph of the discussion.

Response: The conclusion has been revised to avoid repeating the detailed discussion of simultaneous multi-beam lidar configurations. The paragraph now focuses on the main implications and outlook. p. 20.

Sincerely,
Maxime Thiébaud