

## ***Interactive comment on “Wind inflow observation from load harmonics: initial steps towards a field validation” by Marta Bertelè et al.***

**Anonymous Referee #2**

Received and published: 20 August 2020

This paper presents an experimental test of a method for generating estimates of characteristic wind properties based on loads measured on the turbine blades. Overall, I have no major objections to the methodology used or the results presented—it is refreshing to see data from a previous campaign being recycled and used to produce new results. However, I have some more comments and suggestions that I feel could improve reader understanding, as follows:

1. Please provide a description (in text) of shear and misalignment in Section 2.1. The equations are not directly intuitive, and Figure 1 does not actually demarcate the quantities  $\kappa_v$ ,  $\kappa_h$ ,  $\chi$ , or  $\phi$ . Please include units for these, where appropriate. Similarly, please provide a reference or further explanation for eqs. (3a) and (3b), since it is not immediately obvious to the reader why one involves both  $\chi$  and  $\phi$  and the

C1

other does not.

2. I find Section 2.3.2 to be confusing to read. Can you be more precise about what the power law is adding? On page 9, line 16 you say that it is ‘useful’ to fit a power law, but don’t explain why. Since using the power law seems to make the procedure of calculating vertical shear more complicated than horizontal shear, perhaps you could provide a diagram of the steps needed to calculate each state, or a concise list of steps.

3. In Section 3.2, is the SEWS being used to generate the reference value for horizontal shear, given the lack of met mast measurement? This should be clarified. If so, it would seem that the error metric for  $\kappa_h$  is a difference between two competing methods as opposed to an error, which you allude to on page 16, lines 4–5, but isn’t clearly stated. It seems a little inconsistent to provide results for horizontal shear but not upflow angle, since the met tower did not provide data on either.

4. Please provide better evidence for the third conclusion you draw in Section 4, regarding the improvement in the quality of training data when averaged (page 18, lines 13–14). This is an interesting result, but the only other mention of this that I found was a statement on page 15 (lines 13–14), which seem a bit brief to lead to a conclusive result.

I also have the following minor comments:

- Page 3, lines 20–25: Do you have a suggestion of how to get such an ideal measurement? I think that you’re being a bit hard on yourselves, no measurement is perfect!

- Page 6, line 4: Equation 8 (the weighted least-squares solution) should have a bit more explanation. Is  $Q$  known? How did you measure/approximate it?

- Page 5, line 20: Can you provide a reference for the statement that horizontal shear varies less than vertical shear?

- Page 12, lines 1–2: Was that shift not done for the shear, also? Why shift the misalignment measurement but not the shear measurement?

C2

