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Interactive comment on "An innovative method to calibrate a spinner anemometer without use of yaw position sensor" *by* G. Demurtas and N. G. Cornelis Janssen

Anonymous Referee #2

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General comments:

The authors propose a method to calibrate spinner anemometers in case a yaw position sensor is not available. The work is of practical interest as typically in order to calibrate an anemometer one has to know the yaw misalignment of the turbine, which is generally difficult to obtain.

The authors use simulated and real field data to demonstrate the effectiveness of the proposed approach. The calibration exploits the fact that the wind speed measure will depend on the yaw misalignment if the anemometer is not calibrated for correctly compensating it. Consequently, the independency of the wind speed measure from the

yaw misalignment is imposed as a tuning constraint.

Even though the idea seems interesting, the paper cannot be accepted in the current status since there are technical issues to be solved/clarified, missing descriptions which may ease the comprehension and the evaluation of the work, incongruences in the notation and unclear plots.

Personally, I recommend the paper for publication after major revisions. Specific comments and minor corrections are listed below.

Specific comments:

1. It is mentioned that the spinner anemometer gives three outputs, wind speed, yaw angle and upflow angle. The upflow angle is however not considered in the treatment. Is it possible to comment this point and possibly to discuss the effects of upflow angle changes on the calibration results?
2. From equation (1) it seems that the correction consists only in a scale factor. Is it possible to explain why a bias was not considered?
3. What is $\kappa_{\alpha,d}$ (default factor)? and how is it computed?
4. During the calibration, the wind speed is assumed constant. This seems a really stringent requirement especially when the tests last one hour or more (as in this paper). The author should comment on this.
5. From the sensitivity analysis (Sec. 5), the fact that the method be sensitive to the used misalignment range seems clear. In fact, when the turbine is yawed in a range ± 60 deg the scale factor results equal to more or less 1.67, whereas to about 1.5 for a range of ± 90. Please comment.

6. Figure 5 is displayed but not mentioned in the text.
7. Figures 7 and 8 are unclear. x- and y-label may help one understand. Better explanations in the text are also mandatory.

Minor corrections

1. Pag. 1, line 15: please, add definitions for all symbols (U_{hor}, γ, β), which appear here for the very first time.
2. Pag. 1, line 17 and equation (1): please, add the definition of $\kappa_{\alpha,d}$
3. Pag. 2, fig. 1: U_{hord} in the ylabel is displayed without description.
4. Pag. 3, line 6: “consists”
5. Pag. 3, eq. (2): definitions of symbols missing
6. Pag. 3, line 10: please provide a reference for the optimization method.
7. Pag. 4, fig. 2: units of measurements of the plots missing
8. Pag. 5, fig. 3: units of measurements of the plots missing
9. Pag. 6, line 13: γ_{ref} appears here for the first time without explanation
10. Pag. 6, tab. 1: in the table F_a should be substituted with F_α
11. Pag. 7, fig. 5: in the figure F_a should be substituted with F_α
12. Pag. 8, line 15: “increases”
13. Pag. 9, fig. 7: color code missing

14. Pag. 10, fig. 8: color code missing

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