

## Field intercomparison of prevailing sonic anemometers

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### General Comments

“As the last comprehensive intercomparison experiments were conducted more than 10 years ago, ...” is the motivation for the authors do carry out a new intercomparison for prevailing sonic anemometers. They present the analysis and the results in a well-prepared manuscript in a straight and standard way. The sonic-user community will be eager to see how the different instrument types perform. Insofar it is worthwhile to publish their results and it is perfectly within the scope of AMT. There are however some points the authors should address.

The explanation/discussion of the much better agreement is not convincing. I don't understand what the consistent digital data acquisition has to do with the better agreement. Give an example. And demonstrate how your quality tests improve the agreement. You also indicate that contributions in changes of firmware might have an influence. Say more about that. And finally you say that five instruments apply “some sort” of correction. There is more information about the corrections, they should not be treated as blackbox. Add the information where it is existing. E.g. the calibration files for R3 and HS are available and can be applied later (at least it used to be like that). One has the possibility to sample uncalibrated data and apply the calibration afterwards. Did you do that? The HS and the CSAT3: how would they compare then? The sonics from Young and Metek seem to be black boxes but they allow to switch on and off a wake or head correction. You probably used the sonics always with the corrections on. Any idea how strong the corrections are? It irritates me that an instrument like the Young 81000 with a magic wake correction is so close to the other instruments. Insofar I can understand that you find the good agreement “somewhat surprising” and I can follow your conclusion that this is rather a conservative estimate because of special conditions (small variation in angles-of-attac. I guess you investigated the differences on azimuthal dependencies).

The angle-of-attack figure disappeared. It was surprising to see that the deviations from horizontal were that small (mostly within  $\pm 6^\circ$ ). Now there is a standard deviation of  $15^\circ$ . What happened?

I do not see the advantage of using the PCA load in the first place, for deciding on an etalon. Choosing rather one instrument for all comparison is much more stringent and makes it easier to compare the instruments.

Comparison plots are a bit monotone and do not transmit much information. Plotting rather differences to reference than sonic value versus sonic value gives an immediate impression on statistics. For a direct connection to the scatter plots the regression results should be placed in the plots. Special features can be highlighted in the text.

Comment on the speed-related temperature of a CSAT3 (Firmware v3)? You don't mention whether you determined the zero offset of the two CSAT3 before the experiment. Did you? The serial numbers of the CSAT3s tell us that they are relatively old instruments. How long ago was their last calibration? Figure 5: why the CSAT3 deviate that much although they should be better comparable. Could it be related to zero offsets or old calibration?

Technical corrections

Abstract

2/16 (Wieser et al., 2001). Full stop

3/33 indications of a

4/31 synchronized how? Please be more specific how this was done? Why it is that important if you compare just average quantities?

5/5 DE-Fen ?

- 6/5 It looks shaky. Were there guy wires?
- 7/2 All data were processed
- 7/15 DE-Fen
- 8/6 total wind velocity? You mean the magnitude of the 3d vector i.e.  $=(u^2+v^2+w^2)^{0.5}$  compared to the horizontal wind speed  $=(u^2+v^2)^{0.5}$ , which is your mean wind speed?
- 12/5 was chosen as etalon for
- 12/15 CSAT3 is very good except for
- 14/5 Young.81000RE
- 15/5 The lower row is slightly too large so the y-axis is missing
- 16/3 of this study for many
- 16/7 etalon ~~for this quantity~~ because (is a redundant, or omit "For this comparison")
- 17/7 error of due
- 17/6 measurements systems (?)
- 20/2 243-251 instead of 363-372
- 21/6 Frank and Massman listed twice