

Interactive comment on “Estimates of Mode-S EHS aircraft derived wind observation errors using triple collocation” by S. de Haan

Anonymous Referee #2

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General Comments =====

The proposed paper presents a well-reasoned assessment of the observational uncertainties of wind information derived from Mode-S responses of aircraft to a terminal-area radar at Amsterdam Schiphol airport. The technique applied is innovative but has apparently already been proven to perform well. As the author highlights, only known observational uncertainties render the Mode-S wind data usable for numerical weather prediction. Hence this paper is highly significant for operational weather prediction. The scientific quality is rather high since the investigation does not only rely on the minimum number of independent sources and the results are discussed thoroughly. The text not difficult to read and it is easy to follow reasoning, though the wording is unconventional and some information is unclear in detail (see Detailed Comments be-

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low). Nevertheless, the article is worth and - unlike many others - close to be ready for being published. Congratulations.

Detail Comments ===== (sorted by occurrence, only two last digits of page numbers)

p 34 ll 22/23: too small/ too large error -> under/overestimation of the error

p 34 l 23: loose -> weak

p 35 l 11: relatively -> relative

p 35 l 12: which -> that

p 36 l 4: finally -> last

p 37 ll 26/27: Velocity variances alone do not cause echoes, hence poor vertical range around sunrise and sunset. I suggest to state: ... echoes generated by small-scale density fluctuations that are associated only with thermally driven turbulence, which is not always present.

p 38 l 7: seems similar but is a different thing: 3-dimensional wind profile -> profile of the 3-dimensional wind vector

p 39 l 6: "are collocation in time" is not really clear I think it is meant "are regarded as belonging together"

p 39 l 17: What is mean by "has a three-hour cycle"? Surely not the time step. Do you mean "the model stores the state (variables) of the atmosphere every three hours (of model time)"?

pp 39 ff, para 3.1: In aviation, the terms altitude (distance to sea level), height (distance to surface) and elevation (distance of surface above sea level) are rather well established. Could you check the whole text to use these accordingly throughout and to avoid ambiguous naming of similar quantities (i.e. elevation ANGLE)

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pp 39/40, para 3.1.1/2: A sketch would be really beneficial, here!

p 39 l 23: You need surface pressure, too. Or am I wrong?

p 40 l 2: Could you be more specific about the neighboring elevations? Is it "closest elevation (cone) plus one above and one below" (i.e. three) or is it "the nearest elevation above and the nearest elevation below" (i.e. two) ?

p 41 1st para: Does "resolution" denote the smallest increment in data position or in data value?

p 43 ll 12-21: Am I right that a general offset in the wind direction or of the radar azimuth would create such a pattern? If so, how are these accounted for? Apparently this was an issue addressed in your earlier paper about deriving Mode-S wind.

p 44 ll 5-14: The differences are on the order I expect from comparing two SODARS separated by your collocation cell half-width. Did you determine if (and how) your vary with changed dimensions of your collocation cell?

p 44 l 21: "clearly below one": Well they are but giving the actual order (a number) would read even more convincing.

p 44 l 26: Your conclusion about SODAR three-beam mode does not convince me. Again, did you consider a simple azimuth offset.

pp 45-47: Paragraph 4.2 is significantly harder to read than the rest of the text. The (almost) lack of structuring paragraphs makes it difficult to follow (at least reading just once) and to filter out the things to remember. In particular, I am not sure, if I got right what the first half of page 46 wants to state. Given the importance of this discussion, this paragraph should be carefully revised for more clarity.

Table 1: Could be removed. The information is mostly given in the text, too.

Figure 2: Numbers are too small and a lot of space is wasted. I suggest to rearrange for more clarity.

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Figure 7: Is almost unreadable (if printed black/white): Using different line styles (full, dashed, points) for lower, middle, upper pair of heights could help a lot.

Figure 8: Similar to Fig7, but less dramatic.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 12633, 2015.

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