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Geoscientific Instrumentation Methods and Data Systems
Discussions

Interactive comment on "Development and comparisons of wind retrieval algorithms for small unmanned aerial systems" *by* T. A. Bonin et al.

Anonymous Referee #1

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The use of small unmanned aerial systems (UAS) for atmospheric research has distinctly increased during the last years. Due to logistical and regulatory reasons the operation of very small and lightweight systems below 1 kg is favorable for a large variety of Atmospheric Boundary Layer related research operations. As those systems usually do not carry wind sensors, the wind retrieval has to be done indirectly by using information of the aircrafts attitude and ground speed given by the autopilots GPS. The manuscript describes the intercomparison of 3 wind retrieval algorithms for small unmanned aerial systems and presents some examples of the comparison of retrieved wind profiles with radiosonde and sodar measurements. At the end a case study is presented where corresponding measurements have been used to calculate the Richardson number. In this context the presented manuscript deals with a relevant

scientific topic that fits the scope of GI. I recommend the manuscript for publication after some major revisions more specified below.

I feel that the title does not fully resemble the content of the paper. It is clearly a comparison of those algorithms, but I have problems to see a considerable development of those. In my opinion 'Comparison and application....' would describe the manuscript by far better.

My main concern is related to the results of the comparison between UAS and RaSo wind profiles presented here. After my experience it is usually difficult to get reliable wind data from radiosoundings at altitudes below 200-300 m above the ground. This seems also to be visible in most of the examples shown in Figure 5. Therefore I am a bit critical to use these measurements for an intercomparison close to the ground. In this context I also would like to get more information on how the numbers of Table 1 have been derived. I assume it includes all altitudes and therefore could be affected by the RaSo data quality at lower altitudes. One solution could be to present the RMSE for different altitude intervals. It is also not clear for me on how many radiosoundings and UAS profiles the results of table 1 are based. I suggest a more thorough description of the statistical analysis of the UAS-RaSo intercomparison.

Minor comments: Line 21: I suggest to replace 'evolve much quicker' by 'evolve and vary much faster' Fig. 5, 6 and 7: the labels are too small Fig. 6 b and d: I suggest the use of symbols instead of lines for presenting the wind direction

Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss., 2, 953, 2012.