

Interactive comment on “A guide for upper-air reference measurements” by F. Immler et al.

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General comments: The manuscript “A guide for upper-air reference measurements” by Immler et al. provides suggestions and guidelines on the proper handling of upper air measurements and data for use in the identification and inference of long term trends associated, for example, with climate change. These guidelines are described within the framework of the recently created GCOS Reference Upper Air Network (GRUAN). The manuscript is well written and reviews many aspects of upper air measurements and data analysis problematic, including the treatment of uncertainties, their definition, identification, and propagation. It is very well suited for publication in AMT. Published work on a similar topic is seldom in the present literature, and the novelty resides in the fact that a well designed integrated framework (or at least guidelines for it) is provided. The whole framework is still at its early construction stage, and the

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objectives are yet to be fulfilled (see below my comments on the radiosonde example), but the methodology and approach presented here make this manuscript worth being published. It is expected that a much more comprehensive publication on this topic will be available in the upcoming years.

Specific comments and suggested revisions.

1. Title:

The title is too general to my opinion. Not being a native English speaker, I unfortunately cannot provide a much better solution, but in any case, it should reflect the fact that the paper treats more specifically the proper handling of measurement and data processing errors rather than being a comprehensive review of all aspects of the data processing chain (from measurement to end user). My best two suggestions for a revised title are: “Towards robust upper air reference measurements” or “Optimizing the accuracy and long-term stability of upper air measurements”. Any well-designed combination of these two should work. There are enough native English-speakers among the co-authors to address this efficiently. Also, if acronyms are allowed in the title, it would be appropriate to include “GRUAN”.

2. Paragraph 2.1: “expected value of zero”. Should this instead be “expected averaged value is zero”?

3. Paragraph 2.1: Please define “accuracy” in the glossary

4. Fig.1: To my opinion, this figure does not convey its message efficiently, i.e., it does not illustrate clearly the data processing chain. Some improvement would be needed to make it clearer.

5. Paragraph 2.4 (top of page 1817): “reproducible by the end-user” I do not agree with this statement. The end-user does not necessarily have to reprocess from scratch. Instead, it is the role of the data provider and his/her successors to be able to reprocess the data from scratch. Unlike the data provider, the end-user does not have a

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full knowledge of the instruments and techniques; this is the reason why a full error assessment and a traceable metrology are required, and why they should be provided to the end-user by the data provider.

6. End of paragraph 2.5: “if one of the two measurements does not provide uncertainties” This paragraph is unclear. Please expand to justify how a meaningful consistency analysis is still possible in this case.

7. Paragraphs 3.3 and 3.4: There is no details given on the way validation should be handled. Do the authors have any specific ideas already, and can these be included in paragraphs 3.3 and 3.4? One question of particular interest is: Is there any efficient way of combining results from lab tests and in-field campaigns? Also, should there be a “GRUAN-Certified” seal on measurements that have passed standardized tests (that is to say, within the framework of GRUAN). Should there be specific “GRUAN-trained” operators?

8. Radiosonde example

First I would like to echo referee #1’s voice in his comment posted on 4/16 on time-lag correction. However, I understand that the radiosonde example has a mainly illustrative purpose, and a quick mention of the time-lag correction could be simply added to the present text without altering the rest of the manuscript. This radiosonde example illustrates well, however, how far the authors are from their final objectives. For this reason I would suggest to add a last paragraph (before the conclusion) specifically dedicated to current outstanding/unresolved issues, and how these are going to be addressed in the future months/years.

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 1807, 2010.