

Atmos. Meas. Tech. Discuss., referee comment RC1
<https://doi.org/10.5194/amt-2021-316-RC1>, 2021
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Comment on amt-2021-316

Anonymous Referee #2

Referee comment on "Considerations for improving data quality of thermo-hygrometer sensors on board unmanned aerial systems for planetary boundary layer research" by Antonio R. Segales et al., Atmos. Meas. Tech. Discuss.,
<https://doi.org/10.5194/amt-2021-316-RC1>, 2021

The discussed topic is very important for atmospheric measurement on moving platforms and using -IDMP can improve the data quality significantly. But the paper itself shows lots of shortcomings:

1. Does the paper address relevant scientific questions within the scope of AMT?
Yes, definitely.

2. Does the paper present novel concepts, ideas, tools, or data?
The paper discusses the inverse dynamic model processing (IDMP) approach to correct dynamic response errors in the measured signal using simulated input data. This concept is important to improve real inflight data and is a current topic of discussion.

3. Are substantial conclusions reached?
An overview about the topic of thermos-hygrometer-sensors is given and the IDMP approach is well discussed. While the IDMP is deeply discussed other topics like installation aspects and static sensor errors are only dealt within a short literature research.

4. Are the scientific methods and assumptions valid and clearly outlined?
Chapter 2 is listing some theory about turbulence but without a proper discussion about the implications of each equation for this paper and without a discussion about the applicability.

The IDMP is a well suited method and discussed in depth.

The thermodynamic system equations do not include any of the real world installation constraints described in Ch. 5. I shall be discussed if radiation, heat conductivity and heat capacity effects can be neglected.

Chapter 4 and 5 are limited literature reviews without proper discussions about the applicability for the question at hand. Both chapters do not reflect the in depth IDMP discussion.

Regarding chapter 2, 4 and 5: If no detailed discussion is aspired, please clarify the assumption drawn from the source as assumptions with all its limitations.

5. Are the results sufficient to support the interpretations and conclusions?

The IDMP signal reconstruction based on simulated data seems to be consistent. Interpreting the used real data lacks on reference data, which would require proven faster and more accurate sensors. Looking at the used sensors reference sensors exist. I guess it was not possible to tailor the experimental setup for this question here, so I would not call chapter 7.4 an evaluation but an application to real data.

As apparently better looking data are never a proof, this chapter should be check regarding the conclusions. Best would be to add and discuss hypothesis to be falsified or proven using the real data.

Chapter 6 and 7 would need a more critical discussion, especially as the method described by Wildmann et al. 2014b would have needed a critical review before.

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?

To achieve full traceability the used simulated and real data sets should be published in a data repository and cited here.

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

In Chapter 3 it's not clear for me what is cited from Wildmann et al. 2014b and what is the authors contribution. Please clarify.

8. Does the title clearly reflect the contents of the paper?

The title should name the main topic more clearly, e.g. "Correcting thermos-hygrometer-sensor dynamics ...". The term "framework" is no appropriate, as not all aspect are discussed in a proper way.

9. Does the abstract provide a concise and complete summary?

The content of the abstract promises a well balance discussion of the title topic. As written above the paper is IDMP focussed and this should be addressed in the abstract as well.

10. Is the overall presentation well structured and clear?

The overall structure is well understandable.

11. Is the language fluent and precise?

Yes.

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

No mistakes were found.

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

Several items to clarify are addressed above.

Lines 42 – 66: Please check for a certain redundancy in telling the story.

14. Are the number and quality of references appropriate?

As far as I could check, the chosen references

15. Is the amount and quality of supplementary material appropriate?

n.a.

Some further remarks:

Line 23: Radiosondes do also affect their sensors, although in a less dramatic amount.

Ch2: Please clarify the assumption of a frozen pattern and homogeneous isotropic turbulence.

Line 317f: Please justify this assumption.

