



## ***Interactive comment on “Evaluation of wake influence on high-resolution balloon-sonde measurements” by J. Faber et al.***

### **Anonymous Referee #2**

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This manuscript provides a comprehensive analysis of wake effects on balloon-borne measurements. The analysis is focused on highly sophisticated turbulence measurements of the LITOS project but provides also important information for other balloon experiments. The analysis is sound, and the manuscript is well written and very suited for publication in AMT. I recommend publication after a minor revision. My comments mainly concern clarifications that probably would make the paper more accessible/useful to a broader audience.

What is actually a typical wake effect on measurements of turbulence (or other quantities like temperature or humidity)? Please provide more information about this to the unexperienced reader. The manuscript seems to provide examples both of increased

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turbulence and decreased turbulence in the wake (figure 3; page 11, line 5-9; page 11, line 12-13).

At several places in the manuscript it is stated that the wake does not have a clear outer boundary. Rather, one would expect, a continuous transition from a perturbed region to an unperturbed region. On the other hand you use the notation "inside the wake" and "outside the wake" throughout the manuscript. And you introduce e.g. the "radius of the wake" (page 10, line 11). This is not consistent and should be clarified.

Most analysis in the paper is done in terms of likelihood for instruments to encounter the wake of the balloon (or of the payload chain). What would be desirable for balloon researchers is a more "deterministic" algorithm that provides a rather clear statement Yes or No about being influenced by a wake effects in a given situation. Do the authors see any way forward towards developing such a "deterministic" analysis tool?

On page 11, line 12-13, you refer to probabilities exceeding 95% as "wake affected within uncertainty". Would you not consider significantly lower probabilities (e.g. 80% or 60%) as being "wake affected within uncertainty". What is the significance of the number 95%?

Related to the above questions: On page 4, line 18, you refer to a measurement unperturbed by any wake effect. How do you know this?

It would be instructive if you in your conclusions formulated some general advice for balloon researcher about how to deal with wake effects.

Some minor comment:

On page 3, lines 9, 12, 15: It is unclear what "their" refers to in this paragraph. It somehow refers to "other studies" in line 8. Please clarify the formulations.

On page 9, line 9-12, you introduce the amplitude of the balloons horizontal motion. It would be instructive to provide the reader with some typical numbers for this amplitude, e.g. for the LITOS case.

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