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Atmospheric Measurement Techniques Discussions

Interactive comment on "Using reference radiosondes to characterise NWP model uncertainty for improved satellite calibration and validation" *by* Fabien Carminati et al.

Anonymous Referee #2

Received and published: 5 September 2018

This paper presents a detailed comparison between GRUAN radiosondes data and two NWP models (ECMWF and UK Met Office), both in the observation and in the radiance space (ATMS channels). The methodology and results are well explained and the analysis of different sources of errors very careful. I have only minor comments which are as follows:

- In the paragraph from line 404 to 419, it is explained that to compute Tb+ ans Tb-, a one-sigma error is added (resp. removed) to all input variables. But in many cases, even for a single variable like humidity of temperature, Jacobians of the radiative transfer model do change of sign in the vertical which mean that adding a one-sigma error

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on the whole vertical profile does not maximize the difference between Tb and Tb+ or Tb-. So there are not only 8 possibilities as mentioned in the text, the combination to find out the maximum error is likely to be more complex than that.

- In the paragraphs from line 519 to line 532, it is underlined that the ECMWF model is not always find within GRUAN uncertainty but the UK Met Office is. Could it be a matter of observation errors difference used in both models? For instance, if in the UK Met Office data assimilation system, these radiosondes are assimilated with a smaller observation error, it is then more likely that it compares better than the ECMWF model.

Minor technical changes: - line 346, "Fig. 3 shows a the changes from...". Please remove "a". - line 519, the authors discuss the differences for channels 8 to 12 and then mention the red shading of Figure 5 but these channels are not present on Figure 5. Please add them on the Figure or change the text.

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