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Discussions

Interactive comment on "A review of sources of systematic errors and uncertainties in observations and simulations at 183GHz" *by* Hélène Brogniez et al.

Anonymous Referee #3

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The topic of this manuscript is operational satellite measurements around the 183 GHz water vapour transition, including how well these measurements can be reproduced by radiative transfer simulations. Such measurements provide today a large fraction of the information on water vapour in weather forecasts, and the same measurements increase in importance for climate monitoring. Accordingly, the manuscript deals with an important issue and fits AMT well.

I agree with two other referees, both on a general level and in points raised. The manuscript should be published, after some minor changes. Also I would like to see a conclusion section. What are the most plausible reasons to the discrepancies discussed? That is not totally clear after reading the manuscript. As referee 2 I found the

text unclear in some places, mainly due to complex sentences and unlucky choices of words, but I leave this as a general remark.

My main demand is to specify best estimates of relevant spectroscopic variables (line parameters + continua). On lines 196-197 some uncertainty limits are given (which I personally find surprisingly small), but around what values do these values apply? Further, are the assumed best estimates and the error estimates on lines 196-197 consistent with the findings from field measurements discussed around line 216 and 328? And are assumed best estimates used when producing Figure 1 and 2? A table on spectroscopic parameters used in main models (such as MPM, RTTOV and CRTM) would be very useful. And even better would be if the values used for AURA MLS could be included. Are the MLS values inside the specified uncertainty range?

The authors could also help the reader a bit more. The usage of different units is probably unavoidable, but it would be useful to provide some rough mapping between units. For example, can a rough scaling between e.g. 5% error of in-situ data and a simulated brightness temperature be given? Another example is the sentence on lines 333-335. It would be easier for the reader to relate the results to the bias seen in Fig 1. Are the results based on ATOMMS consistent the sign of the bias in Fig 1, or is it reversed?

Smaller comments:

Line 47: I don't see the point in comparing systematic errors with the noise. The systematic error should (and can) be small even for a noisy instrument.

Line 65: "snow of", should "snow and"? (In any case, would be good to clarify if falling or surface snow is discussed).

Line 116: Can a reference from 2007 be valid for most recent campaign?

Line 118-119: Unclear. What is meant with "considerably small"? That is, what is compared here, different atmospheric layers?

Line 123: It must be motivated why GNSS is included. The unclear link to the topic of the manuscript is also reflected in the last sentence of the paragraph ("might"!). And clarify that the topic is ground-based GNSS.

Line 175: To my best knowledge, ARTS can make use of several water vapour continua models.

Line 342: I don't see the logic in "Accordingly" here.

Text of figure 1: Is that really the name of a single campaign? That seems to be two or three campaigns. And why defining acronyms here?