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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Uncertainty of atmospheric microwave absorption model: impact on ground-based radiometer simulations and retrievals" *by* Domenico Cimini et al.

Anonymous Referee #1

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Uncertainty of atmospheric absorption model in the 20-60 GHz range: impact on ground-based microwave radiometer simulations and retrievals.

The paper presents a review of current formulations of the microwave absorption parameters between 20 and 60 GHz examining in detail the uncertainties associated with each parameter. It then identifies the spectroscopic parameters that most affect microwave brightness temperature measurements at commonly used channels and it estimates the resulting covariances due to the atmospheric model.

The manuscript is well written and organized and it provides an important contribution for users of microwave data to retrieve atmospheric parameters.

My only concern is related to how these uncertainties affect the measurements and retrievals. I would expect most of the forward model uncertainties to be systematic (biases) and therefore difficult to characterize in terms of covariances? Can the authors comment on this aspect of the uncertainties.

A second question is about Fig. 11. The uncertainty in Q seems very high for Arctic atmosphere as Arctic specific humidity can be as low as 0.5 g/kg which would make the spectroscopy uncertainty about 50%. If Fig. 11 represents the uncertainty only due to the spectroscopy, to which all the other uncertainties, such as radiometric noise, etc. are added, does this make the whole microwave retrievals useless in dry conditions?

Thank you

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