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Interactive comment on "Arctic Snow Microstructure Experiment for the development of snow emission modelling" *by* W. Maslanka et al.

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Thank you for the thorough review of the paper. We will now answer your comments and suggestions in the presented order. The original comment will be displayed, followed by the response.

Comments

1. In table 3 it is mentioned that the snow physical parameters are average quantities and that means that there are MIN and MAX values, RMS, etc. I understand that the measurements re not all from the same spot, in any case there is spatial variability, and variability even within the sample, and measurement uncertainties. It would be nice to see an estimate of this variability together with the average values in table 3.

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Table 3 was altered slightly, to include the standard deviation for each physical parameter alongside the bulk average value as suggested. This allows for the variability of each slab measurement to be seen.

2. I would suggest to try a couple of different scattering models to see if this could minimize the differences between simulations and measurements.

Two different extinction coefficients (developed by Hallikainen et al. 1987, and Roy et al. 2004) for use within the HUT snow emission model, as well as two separate scattering coefficient regimes for use within MEMLS (the recommended scattering coefficient for MEMLS, as well as the empirical scattering coefficient from the Improved Born Approximation). The RMSE and bias were calculated for the three frequencies and 4 different experimental situations, however the differences between the RSME and bias values were very similar, and did not minimize the errors by a significant amount. The lack of significant difference between the RMSE and bias values may stem from the small slab thickness (all slabs had a thickness of <20cm). If the slab thickness was greater, the different extinction coefficients and scattering regimes may produce a larger difference in RMSE and bias.

References

Hallikainen, M., Ulaby, F., and Van Deventer, T.: Extinction Behaviour of Dry Snow in the 18- to 90- GHz Range. IEEE T. Geosci. Remote, 25, 737-745, 1987

Roy, V., Goita, K., Royer, A., Walker, A., and Goodson, B.: Snow Water Equivalent Retrieval in a Canadian Boreal Environment from Microwave Measurements using the HUT Snow Emission Model. IEEE T. Geosci. Remote. 42, 1850-1859, 2004.

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