Atmos. Meas. Tech. Discuss., 8, C1270–C1271, 2015
www.atmos-meas-tech-discuss.net/8/C1270/2015/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Characterization of downwelling radiance measured from the ground-based microwave radiometer using the theoretical reference data" *by* M.-H. Ahn et al.

Anonymous Referee #1

Received and published: 27 May 2015

The authors present a dataset collected at the Changwon Weather Station in South Korea and present a methodology that uses data from a numerical weather prediction model to correct for biases in the radiometric brightness temperatures. Major comment:

Although I understand the expedient of adjusting the center frequency of the observed data to an "effective center frequency" that minimizes the differences between ECMWF and observed data I fundamentally disagree with the approach outlined by the authors to use the ECMWF data to "calibrate" the MWR data. In my opinion such expedient does not provide a real estimate of the center frequency shift. It merely ensures that when using the data in conjunction with the ECMWF model the resulting estimator is

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unbiased.

One of the points of strength of microwave radiometers is the fact that they provide an independent set of measurements to be used to evaluate radiosondes and model performances. As a matter of fact well-calibrated radiometers are used to correct for radiosondes biases and have been successfully used to refine radiative transfer models, not the other way around. When model data (or even radiosondes) are used to calibrate the radiometers the dataset won't be independent anymore, but it will be biased to whatever dataset was used to calibrate them (in this case ECMWF or KLAPS) with the addition of uncertainty in the radiative transfer.

This is shown in Table 4 where differences between the ECMWF and KLAPS-adjusted center frequencies vary from 10 MHz to 60 MHz. As a reference for the authors I note here that if the center frequency is properly selected with a local oscillator the accuracy is expected to be of the order of 100 KHz (0.1 MHz).

I understand that the data collected can't be changed, however I think the authors should discuss the limitations and drawback of the technique that they are using as a warning to potential users of the data. For future data, my suggestion would be to fix the radiometer (if this wasn't done already) so that it can be reliably and independently calibrated.

Minor points

The explanation of Table 3 seems mismatched with the table content.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 4347, 2015.