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Atmospheric Measurement Techniques Discussions

Interactive comment on "Radiometric correction of observations from microwave humidity sounders" *by* Isaac Moradi et al.

Anonymous Referee #1

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General Comments

Creating a consistent long-term observation dataset for microwave humidity sensors is an important topic of study and the dataset described in the paper is widely used by many in the scientific community. Users will find this manuscript to be a valuable reference. There are several points of clarification that will improve the manuscript as I have outlined below. I recommend for publication after these are addressed.

Specific Comments

Section 2 should include a listing of the frequencies associated with each channel number. I am assuming Channel 1 is 89 GHz, Channel 2 is 150 GHz etc., but this is not stated. Also, it is confusing that you say "fifth channel...89 GHz" when you do in a

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later section say that Channel 1 is 89 GHz. I would not use the labels of "first, second, etc." unless they directly correspond to Channels 1, 2, etc.

Section 2, second paragraph, first sentence. AMSU-B is vertically polarized, while Channels 3 and 4 of MHS are horizontally polarized (you have these switched in the sentence).

I would like to see some more details about how the polar regions are used in the intercalibration. What kind of filtering was done for the area averaged brightness temperatures over the Antarctic and Arctic? Is there a reference or some kind of evidence to show that the diurnal cycle of temperature and humidity is negligible in the polar region? Page 5, 1st paragraph mentions how the diurnal cycle in polar regions and tropics are negligible but only gives references to back up this claim for the tropics. Also, in the polar regions, some of the channels especially the window channels see the surface, which will change seasonally. How is surface variability accounted for in these channels so it doesn't impact your intercalibration and cause a seasonal signal?

In Figures 1 and 2 it is really hard to see any trends in the data as its rather noisy and all the channels are plotted on top of each other. Page 7, 1st paragraph refers to some trends that can be seen in Figure 2 but this is a bit hard to see. Perhaps you could do separate subplots for each channel, and maybe plot a running average on top of the raw data so that trends can be more easily observed?

Is Figure 3 the intersatellite differences for the tropics? And it sounds like Figure 4 shows the same thing as Figure 3 but is over land while Figure 3 is over ocean only? Please make this more clear in the text as well as the figure labels.

Figure 5 does not appear to be referenced in the text except on page 8 (where it says "see Figure 5"), but there is no description in the text for what exactly Figure 5 shows. Is it an average over the years for the ocean measurements?

Figure 6 caption says "time series... tropical and polar regions", however from the text

it sounds like this is showing only the tropical regions.

Figure 7: The really light colors (for 50S-70S and 70S-90S) are hard to see. I recommend making the colors darker.

Figure 7: The southern polar region (70S-90S) shows a lot of variability with some extreme outliers. Are all values averaged or some filtering done to remove these outliers?

Figure 8: Channel 5 slope and intercept appear to have a seasonal signal associated with it. Any idea why this is? I would be concerned that a seasonal signal is being incorporated into the intercalibration.

Technical Corrections

Remove commas after the word "Although" when used at the start of a sentence (this happens many times throughout the manuscript).

Page 11, line 267. Change "references" to "reference".

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