

Interactive comment on “The Moon as a photometric calibration standard for microwave sounders” by Martin Burgdorf et al.

Anonymous Referee #2

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Overall:

I find the subject matter of the manuscript interesting and of value to the community. However, I feel the manuscript is lacking in any detailed analysis to back up the author's claims. Perhaps the intent of the manuscript is just to present a theoretical analysis, but I think it would greatly add to the paper to show some current data, since there are several microwave sensors currently in orbit that the authors can use to show the use of the moon as a calibration target.

Specific Comments:

It's not clear to me in the paper just how accurate the authors expect the moon as a calibration target to be. I would like to see them estimate some accuracy in terms of Kelvins. It seems like there is a lot of error associated with using the moon as a

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calibration target, and it's unclear to me what value a moon calibration target would add in addition to using deep space maneuvers. Dedicated maneuvers of spacecrafts have been performed to view deep space (e.g. TMI and GMI), so it would be worthwhile to mention what benefit of doing a maneuver to view the moon would add, since deep space is much more stable, is an accurately known value, and easier to measure than the moon as a calibration target. The authors state the accuracy of ICI and MWI is 0.5 K and say “it will be easy to bring the random uncertainty far below this value by combining a sufficient number of exposures to the moon”, but I didn't see anything to back up that claim.

Throughout the paper there are references to ‘microwave sensors’. The title states using ‘microwave sounders’. The authors mention AMSU-A, MHS, and AMSU-B which are all sounders, but then they say this can be used for the future ICI and MWI, which are not sounders. It would be good to clarify the language of exactly which microwave sensors you think the moon calibration target can be used for, including the frequency range since these sensors encompass a very wide range of frequencies.

It would be helpful for the reader who is not as familiar with the microwave sensors you describe to include a table of at least the frequencies for AMSU-B/A and MHS to help understand which frequency range you are talking about.

As stated above, I feel the manuscript would be enhanced by showing some examples of what the moon looks like in the DSV. Since it sounds like no dedicated spacecraft maneuver has been done to view the moon as you proposed, some examples of how it appears in the DSV may help the reader with understanding what the moon looks like in the DSV and allow the authors a way to validate their claims.

Page 2, line 31. The top of the atmosphere of the Earth is not used as a calibration target. Perhaps you mean TOA brightness temperature? I would re-word to be more accurate.

Page 3, first sentence says “All microwave sensors...” but this statement is incorrect

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since not all microwave sensors use a 2 point calibration.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-32, 2016.