

Interactive comment on “Inter-channel uniformity of a microwave sounder in space” by Martin Burgdorf et al.

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This is a reply to the comments of referee Dr. Yang.

Thank you for your careful and helpful comments on manuscript amt-2017-405 - here are some remarks of ours:

1. It is not true that the Moon appears most of the time in only one FOV. It can still be detected at a distance of 1.5 degrees from the center of a given FOV. This means that it is barely detectable in FOVs one and four if it is exactly in the middle between FOVs two and three. I do not know the expression "smear effect", please explain.
2. The Cosmic Microwave Background is constant in time and space, therefore its impact on the ratios we calculated is always the same. Variations of the Earth's ra-

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diation entering through the side lobes and noise can indeed affect the signal in an unpredictable way. We decided to calculate only the overall random uncertainty from the random scatter of the ratios. This is sufficient to decide whether they change significantly in time or not.

3. We used here an approximation and shall include an estimate of the error caused by this approximation or the exact value in the revision of the manuscript.
4. See answer to second comment, the overall random uncertainty is calculated from the scatter of the ratios between the channels among all different Moon intrusions without consideration of the size of each contribution.
5. See first comment.
6. "Much smaller" is not true for full Moon close to perigee. We shall select Moon intrusions, where the Moon fulfills this condition and calculate a new upper limit on the non-linearity based only on these intrusions in the revised version of the manuscript. We agree with the referee, however, that the non-linearity can be constrained by normal observations of the polar regions of Earth as well.
7. The reasoning will be made clearer in the text.
8. It is difficult to characterise the RFI now, because no dedicated procedure (switching the transmitters on and off) was carried out with AMSU-B on NOAA-16 in flight. A detailed study of RFI is beyond the scope of our paper, but we appreciate the referee's suggestion to provide additional evidence for the presence of RFI. We shall try to do so in the revised version of the manuscript.
9. See seventh comment, the key argument is here that the flux density of the Moon changes with frequency even when the brightness temperature does not.
10. Yes, there is a strong decrease of the instrument gain over the years. We shall follow the referee's suggestion to check again the calculations of the dynamic range of the counts from DSV and OBCT as well as from Earth scenes and Moon intrusions.

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C3