

Interactive comment on “Inter-calibrating SMMR brightness temperatures over continental surfaces” by Samuel Favrichon et al.

Anonymous Referee #1

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The authors have developed a method for adjusting the calibration of the Scanning Multichannel Microwave Radiometer (SMMR) on the Nimbus 7 satellite. This instrument was plagued with a multitude of problems making it very difficult to work with. However, problematic or not, it was the only microwave imager operating for almost a decade in the 1970s and 1980s. It is incumbent on the scientific community to salvage the data from this instrument as well as possible. The present paper is a significant contribution to this effort.

In spite of the lack of a common observing period, they have chosen to use the GPM Microwave Imager (GMI) on the Global Precipitation Measurement satellite as a reference. The GMI is exceedingly well calibrated and is suitable as a reference instrument. They have to make assumptions in order to get around the lack of a common observa-

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tion period.

They have only dealt with two of the five frequencies on SMMR. The radio frequency interference problem would make any use of the 6.6 GHz channel very difficult and the 21 GHz channel is not very useful over land. However, it is disappointing that they did not include the 10.7 GHz channel in their study.

The writing is not exactly native English but there is no problem with understanding.

Detailed comments:

P4 Line20: "Njoku et al. (1980)" This reference is for the SMMR on SeaSat which only lasted for 99 days. It is of limited applicability to the SMMR on Nimbus 7 which is the topic of this paper.

P5 Line 6: "...upgraded to SSMIS..." It's not good to lump the SSM/I and the SSM/IS together. They were manufactured by different companies and were very different in terms of the problems. In particular, the SSM/IS had a very large problem with emission from the main reflector. From a calibration point-of-view they are not at all the same sensor.

P5 Line 13 "The fundamental...changes in the environmental conditions..." This is a necessary assumption for them to proceed, but it is also a severe limitation. The results cannot be used to look at secular changes over the 3 decade time difference between the two satellites. While this is a seemingly obvious limitation, they should highlight it. Otherwise somebody will waste a lot of time and effort drawing specious conclusions.

P6: They compare the various channels of SMMR and GMI directly with no algorithm to account for small frequency and view angle differences. They argue that these differences are small. Given the problems of the SMMR, these differences are probably small relative to the other uncertainties in the comparison. However, for comparisons of higher quality sensors (e.g. Windsat vs GMI), this would not be adequate. When I agreed to review this paper, I was hoping that I would see some land surface modeling

to support the intercomparison. Alas, 'twas not to be.

P8 Line 2. "...erroneous warm calibration load temperature" Note that an error in correcting for the portion of the antenna pattern that misses the Earth would have the same form. Either one would result in an intercept of 2.7K and only slightly different slopes than given in Table 3.

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