

## ***Interactive comment on “ISMAR: an airborne submillimetre radiometer” by Stuart Fox et al.***

### **Anonymous Referee #2**

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This manuscript of Fox et al. introduces a new airborne microwave radiometer, ISMAR, that has been flown on 17 flights. Focus is given to technical aspects, with a special emphasis on the calibration procedure. The manuscript content fits well with the scope of AMT. The exact scientific value is difficult to judge for a person not active in this specific field, see below. The presentation quality of the manuscript is high.

The calibration of ISMAR appears to have been characterised with great care, and this is the main contribution of the manuscript. The discussion is not completely specific for ISMAR. The main contribution of general interest is the derivation and application of Eq 14. In short, Fox et al. introduce treatment of time-correlated noise, for measurements outside the temperature range covered by the two calibration loads.

In contrast to the detailed discussion of the calibration process, information on some other instrument aspects is surprisingly sparse. I am here mainly thinking about antenna, sideband and channel characteristics. I understand that the calibration is the

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most critical aspect, but I expected to find basic data on these instrumental properties in an introduction of a new instrument. Maybe exact measurements are not hand/needed, but best available data should be presented. The only information at hand is that the angular resolution is better than 4 degrees and that the sideband imbalance is max 1 dB. I would suggest to add:

The HPBW for each channel in Table 1.

Comments in the text to make clear if the antenna response has been measured or not. If not, can it be expected to roughly Gaussian?

How was the sideband imbalance estimated? Has a 1 dB imbalance any practical impact of the measurements that ISMAR will perform?

What is known about the channel responses (i.e. the relative response as a function of IF)?

This information is essential for satellite sensors, and I assume the same should be true for airborne measurements.

My second main criticism is that the Introduction lacks a review of older similar measurements. I don't think this can be considered as general knowledge. Most importantly, is ISMAR the first airborne instrument of its kind? And ICI, also first of its kind? If yes, what are the closest forerunners to these measurements? (On the airborne side I know about some limb sounding instruments operating at similar frequencies, such as ASUR). The lack of such a review makes the overall scientific value vague.

The manuscript is very well written, and I have only one detailed comment. Is it not possible to find a more direct and easily accessible reference for Eq 4? That is, I suggest to replace/complement Jones (1995).

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