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Atmospheric Measurement Techniques Discussions

Interactive comment on "Ground-based Multichannel Microwave Radiometer Antenna Pattern Measurement using Solar Observations" *by* Lianfa Lei et al.

Anonymous Referee #3

Received and published: 7 October 2020

General remarks

The manuscript describes antenna measurements of a microwave radiometer using the sun. To my knowledge this is one of the first thoroughly study done for temperature and humidity microwave profiler. However, antenna measurements using the sun is a well-established technique and e.g. applied routinely by the European weather radar community for monitoring receiver performance and pointing accuracy. I miss any clear statement why it is necessary for microwave radiometer measurements and what are the benefits of such measurements. In some points the manuscript gives unnecessary details.

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Discussion paper

In the present state the manuscript requires major revisions before it can be published.

- The method is not novel, nor is the application novel. A potential novelty needs to be elaborated in detail and the benefit for MWR measurements have to be highlighted

- Technical detail of the MWR model are missing: antenna size, frequencies in K- and V-band, number of receivers

- Equations for sun azimuth and elevation are not necessary since they don't describe the necessary information as long as the declination is not given

- Too many details in the sections about "model of atmospheric TB" and "model of the antenna power pattern". Why is the opacity of the atmosphere relevant for this study?

Minor remarks

English grammar and spelling need to be checked. There are many recurrences of statements.

The DOI links in the references have wrong syntax: should be https://doi.org/ or doi: instead of https://doi:

Lines 38 - 39: check English grammar

Line 44: Laura et al., 2017 is missing in references

Lines 48 - 50: check English grammar

Lines 51 - 71: several recurrences of statements

Figure 2 is not necessary, this is not a paper about calibration

Figure 3 is not necessary, the solid angle of the sun and estimated solid angle of the antenna give sufficient information to the reader

Line 140: "only solar emission" What else?

Line 152: "solid" instead of "sold"

Figure 4: different date as in Figure 5. How can this be related to each other? Not relevant for this manuscript

Lines 170 - 175: very difficult to understand. How can the antenna be fixed (line 174) during a sun scan (line 174)?

Line 173: smaller than 10°

Lines 182 - 187: I do not understand the context

Line 189: Holleman et al., 2010

Line 196: Remove, this has been written very often now

Lines 217 - 219: what is the calibration angle? Is it 0 in azimuth and 0 in elevation?

Figure 7: what are the markers, what are the lines?

Line 237: what is the H-plane and E-plane in this context? Solar radiation is not polarized

Line 254: what is D?

Line 262: Holleman et al., 2010

Line 267: calculated

Table 2: it would be necessary to have more than one measurement series to get statistical relevant accuracy of the antenna parameters

Line 297: Why should one use a MWR to observe the radiation of the sun? What will be the context? What will be the difference to the current manuscript?

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