

Atmos. Meas. Tech. Discuss., referee comment RC2  
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## Comment on amt-2021-165

Anonymous Referee #2

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Referee comment on "Ground mobile observation system for measuring multisurface microwave emissivity" by Wenying He et al., Atmos. Meas. Tech. Discuss.,  
<https://doi.org/10.5194/amt-2021-165-RC2>, 2021

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This work presents a well-designed emissivity observation experiment, including a dual-frequency, polarized microwave radiometer on a mobile platform as well as *in situ* measurements of coincident environmental parameters. Five different surface types are created and observed over a one month time period. The work is well performed and described. Some questions and comments amounting to minor revisions are given below.

-In the "real world" of satellite footprints, a homogeneous surface is rare. What are the authors' thoughts about what this experiment can tell us about emissivity variability in a heterogeneous field of view? Are there any plans to create something like this?

-Is this an ongoing experiment? It would be interesting to see data over a longer time period. Similarly, vegetation emissivity (higher than grass) is a key missing component here and vegetation life cycle would be a really interesting case to explore with this setup (though not necessary for this paper - something for future study).

Abstract line 11: I realize this is the abstract, but a couple of words at the end of the first sentence as to why would be helpful here (e.g. due to the relatively small hydrometeor signal as compared to the land surface emission)

Line 20-21: this occurs frequently in the paper that "sensitive to land surfaces" is used. I

suggest changing these instances to "sensitive to surface type" or "sensitive to land surface variability" or similar.

Line 35: "obscures radiance from the atmosphere and hydrometeors"

Line 45: Remove "Furthermore"

Lines 90-92: Another important limitation is availability and accuracy of necessary input parameters on a global scale.

Lines 137-138: Add frequencies to this sentence.

Line 164: Could also add another GMI here - the NASA GPM Microwave Imager also has these frequencies.

Line 197: How many fixed times per day?

Lines 200-207: This might be a good place to say something about penetration depth at these frequencies for each surface type.

Line 232: replace humidity with moisture

Figure 4: Some Chinese characters on lower left

Line 310: refer to Figure 5 here.

Line 336: "more sensitive to the land surface type"

Line 342: Remove "In addition"

Line 353: Remove "Furthermore"

Figure 6: It might be interesting to add a line on these plots identifying the 36 degree (53-degree incidence) angle for reference

Figure 7: Expand the caption with more information and label panels a) and b). Add information about time period of averaging and identify the b) panel as polarization difference

Line 416: Remove "Hence"

Line 419: "the observed polarization difference"

Line 422: Remove "Moreover"

Line 403: Please include some discussion of differences between the Tb and emissivity plots, and why they occur

Line 414: "more sensitive to land surface type"

Variability with weather conditions is never really discussed - one would expect an emissivity decrease after precipitation due to water on the surface for example. Was this observed?