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# Comment on amt-2021-165

Anonymous Referee #3

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-RC3, 2021

The authors established a ground observation system to estimate the surface emissivities from brightness temperatures at four channels (18h, 18v, 36h, and 36v). The results are interesting. But the paper wasn't written clearly and the paper lack of some necessary information. The errors in the title of y-axis for figures 5,6,7,8 needs to be corrected. The authors provide the measurement accuracy of the brightness temperature (1K), which is the specification of the radiometer. But, the authors didn't give the accuracy of the derived surface emissivities.

Specific comments:

- "Xie et al. (2017) developed a parameterized soil surface emissivity model for bare soil surfaces and compared with Weng's model, results reflected the reduced overall errors, especially for horizontal polarization." is unclear, whether Xie's model is more accurate?
- Define the emissivity polarization difference (vertically polarized – horizontally polarized?)
- Change "angle" to "angles" in line 28.
- Explain why "but exhibit the opposite trend over water" in line 28.
- The soil emissivity depends on soil moisture and temperature. The authors mentioned the measurements in lines 231 and 232. The authors may provide the information in a table.
- Water surface emissivity is a function of a surface wind. The surface wind is missed from the paper.
- (1) and (2) are good for a specular reflection. The authors may add sentences about why the surface reflection here is neither Lambertian nor BRDF.
- The brightness temperature change for cement and sand in (a) of Fig. 5 follows the change of the surface temperature. But the brightness temperature for soil and grass between 8 and 12 looks strange. The authors can use the data in Fig. 5 to derive the surface emissivity.
- The y-axis titles in (b) of Fig.(5), (c) of Fig.(6), (b) of Fig.(7), and (c) of Fig. (8) aren't right. The title should be "Brightness temperature difference" or "Emissivity difference".