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Hydrology and Earth System Sciences Discussions

Interactive comment on "The sensitivity of land emissivity estimates from AMSR-E at C and X bands to surface properties" *by* H. Norouzi et al.

Anonymous Referee #2

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The paper by Norouzi et al. describes the development of a global land emissivity product using AMSR-E observations, and an investigation of the sensitivity of this product to land surface properties. The focus is on the C and X bands of AMSR-E. The emissivity product is reasonably consistent with a similar product based on SSM/I observations. The surface emissivities showed expected behaviour with changing surface properties (soil moisture, vegetation density, surface roughness) in most areas. However, the authors found quite large differences in emissivity between ascending and descending (day and nighttime) overpasses. This was a result of the use of skin temperature in the emissivity retrievals, as this temperature does not always correspond well to the temperature at penetration depth for these lower frequencies.

In my opinion the paper is well written, quite clearly structured, and the scientific methodology seems sound. However, I find the results average and rather general, even taking the global scale of the study into account. It does not become clear to me what the benefits of using this product would be to users. The product does not seem to bring any new insights in itself, as the emissivity behaviour is all 'as expected', and neither do the authors succeed in making it clear how it could improve existing applications. Only some vague ideas are given for the latter (e.g. "[it] can be used as additional indicators of land cover or vegetation type variation at global scales." (Ch.5 Conclusions)) but the results are not specific enough to convince or inspire. No temporal analyses (e.g. of emissivity and surface characteristics) were presented although the product covers a six-year period. And finally, if the skin temperatures do not work well enough, why not try to improve the product by using more in-depth temperatures from some other source?

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