

Interactive comment on “Information – based uncertainty decomposition in dual channel microwave remote sensing of soil moisture” by Bonan Li and Stephen P. Good

Anonymous Referee #3

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The paper by Li and Good tackles a very important problem of trying to understand the contributions of the sources (observations and model) of uncertainty in SMAP soil moisture retrieval. In general I found the paper easy to read, typographic errors notwithstanding, and as a non-expert in information theory I followed the logic of the arguments well. However, as an avid user of SMAP products, I would have like to have seen some attempt to translate the findings into the soil moisture units (m^3/m^3) and discussion of how the findings may be useful when next I process large time series of the SM estimates.

Specific comments:

C1

Clarify the denominator in Eq. (4)

Scale disparity between in situ and image pixels resolution is not well addressed and I dare say a major contributor to the uncertainty. The conclusion that 88% of the uncertainty is attributable to uncertainty in T_b is a little hard to accept.

L251-258, Fig. 4, and L347-350: This was confusing and can do with greater clarification to aid in the interpretation of the results. As I read it, the fraction of model-to-overall uncertainty is negatively correlated with the $\text{cor}(\text{in situ}, \text{MDCA})$, while positively correlated with $\text{error}(\text{in situ}, \text{MDCA})$. What does this mean and what are the implications for model refinement?

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