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Hydrology and Earth System Sciences Discussions

Interactive comment on "Extension of the Hapke bidirectional reflectance model to retrieve soil water content" *by* G.-J. Yang et al.

Anonymous Referee #1

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This study presents an extension to a BRDF model for soils, along with its calibration and validation estimating soil moisture content using a set of in-situ measurements. The paper is well written and relatively clear, but there are a few minor revisions that need to be addressed before publication.

- p. 3668, line 20, "data remains largely unavailable": it would be good to elaborate a little, e.g. sparse in-situ measurement networks. - p. 3670, line 2, "the radiation transfer theory": might want to change that to "radiative transfer theory". - p. 3670, line 6, "...to study physical properties of the soil.": reference? - p. 3675, line 8: adding a short description of Powell's method would be beneficial. - p. 3675, line 26: consider adding a list of symbols in an appendix; it would be very helpful for the calibration section

of the paper. - p. 3678, lines 8-9, "...results of the SWAP-Hapke parameters and the RMSE distribution were based on simulated data": this is a bit confusing, weren't observations used to calculate the RMSEs? - p. 3678, line 23: were the parameters estimated tested for robustness, i.e. would similar results be obtained if a subset of the measurements were used? - p. 3679, line 8: change "appearing in the" to "appearing in" if the symbol instead of the variable name is used. - p. 3679, lines 9-10, "the spatial variability of soil moisture distribution": add a "the" before "soil moisture". In addition, this conclusion begs the question (which is hinted at in the Conclusions section) of the applicability of the model to satellite-scale observations. Moreover, how could the presence of vegetation potentially impact the estimation? Obviously, these would not need detailed answers, but some perspective from the authors would be a valuable addition. - p. 3680, line 4, "simulated and compared with the fourth set of multi-angle observation values": was this done with only once? That is, were the other three sets used interchangeably for the validation? - p. 3680, line 6: change "model simulated values" to "model-simulated values". - p. 3689, Fig. 2: make the green line thicker.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 3667, 2011.