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Hydrology and Earth System Sciences Discussions

Interactive comment on "Comparing soil moisture retrievals from SMOS and ASCAT over France" *by* M. Parrens et al.

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Reviewer #2

The authors thank the anonymous reviewer #2 for his/her review of the manuscript and for the fruitful comments.

2.1 [It would be interesting to enhance that discussion with the use of different soil layer configurations of the model if they were available.]

Response 2.1

Indeed, the use of a multi-layer soil hydrology scheme could permit the analysis of the

soil sampling depth at L-band and C-band, and could be the subject of a next study.

2.2 [In some rare cases spelling mistakes should be corrected: p. 8568, line 24; p.8575, line 15; p.8580, line 10]

Response 2.2

It will be corrected in the next version of the manuscript.

2.3 [P. 8573, section 2.3: So, does the model include three soil layers for the soil moisture modelling (1 skin layer, one for the root zone and a deeper one)? Please clarify.]

Response 2.3

The land surface model used in this study represents two soil layers. The first layer includes the root-zone, represented by a bulk reservoir corresponding to the maximum rooting depth, and a representation of SSM associated to a skin soil top-layer. The latter is used for the computation of the soil evaporation. The second layer is a deep, sub-root soil layer contributing to evapotranspiration through capillarity rises (Boone et al., 1999).

2.4 [P. 8574, line 1: What is the atmospheric forcing produced by SAFRAN? E.g. Interpolated station data? Please add a sentence to clarify.]

Response 2.4

SAFRAN uses information from the automatic, synoptic and climatological networks of Météo- France and a first guess from large scale operational weather prediction models. An optimal interpolation method is used to analyse surface atmospheric variables (Durand et al., 1993,1999).

2.5 [Please discuss the applicability of this approach to other regions (especially the derivation of soil moisture from SMOS Tb data by the use of regressed empirical logarithmic equations).]

Response 2.5

The derivation of SSM from SMOS Tb data by the use of regressed empirical logarithmic equations is a simple statistical way to retrieve SSM. As shown in this study over France, the application of Eq. (2) over large areas requires additional information provided by a land surface model. A priori, there is no obstacle to the extension of this technique at a global scale. The LAI can be either computed by a land surface model or derived from satellite observations. It must be noted that the regression coefficients found over France cannot be directly extrapolated to other areas. Nevertheless, France presents a large variety of soils and vegetation types, various climatic regions, also, which permits the validation of the approach. Also, these regression coefficients may depend on the used SMOS-L1 version, and may have to be updated from one version to another.

REFERENCE:

Durand, Y., Giraud, G., Brun, E., Merindol, L., and Martin, E.: A computer-based system simulating snow-pack structures as a tool for regional avalanche forecasting, Ann. Glaciol., 45, 469– 484,1999.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 8565, 2011.