

***Interactive comment on “The impact of land
surface temperature on soil moisture anomaly
detection from passive microwave observations”
by R. M. Parinussa et al.***

Anonymous Referee #2

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This is a well-written paper of interest for HESS readers, it addresses an important issue regarding the retrieval of soil moisture from remote sensing. Surface temperature estimates are, among others parameters, required for the retrieval of soil moisture from remote sensing. While previous satellites such as AMSR-E and Windsat are able to provide Ka-Band measurements allowing an estimation of surface temperature, the SMOS spatial mission as well as the upcoming SMAP mission lack this information. As a matter of fact, surface temperature estimate has to come from ancillary sources such as reanalysis. The paper is well structured and clear. The title clearly describes the contents of the paper. The abstract provides a concise and complete summary, the

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reference list is appropriate but could be enlarged. The language is fluent and precise. The results are generally sound and well supported with figures.

My recommendation is mainly for reinforcing the clarity of the paper as a lot of information are provided to the reader. A number of comments/suggestions that the authors could consider follow below :

P.6684, L.14-15 ; "Because of this, ancillary – and potentially less accurate – sources of 15 surface temperature information [...]". I found arguable that K-band based surface temperature retrievals are "less accurate" than re-analyses. Please, consider adding more informations on this subject.

P.6685, L.10-13 ; "Most recently [...] (Kerr et al., 2001)." Please update with either Kerr 2007 or Kerr et al., 2010.

Kerr, Y. (2007): Soil moisture from space: where are we?, *Hydrogeol. J.*, 15(1), 117–120. Kerr, Y.H., Waldteufel, P., Wigneron, J.-P., Delwart, S., Cabot, F., Boutin, J., Escorihuela, M.-J., Font, J., Reul, N., Gruhier, C., Juglea, S.E., Drinkwater, M.R., Hahne, A., MartiñAn-Neira, M. & Mecklenburg, S., (2010). The SMOS Mission: New Tool for Monitoring Key Elements of the GlobalWater Cycle. *Proceedings of the IEEE*, 98 (5), 666 - 687.

P.6685, L.20 ; Please consider adding reference from Schmugge, 1983.

Schmugge, T. J. (1983). Remote sensing of soil moisture: recent advances, *IEEE T. Geosci. Remote Sens.*, GE21, 145–146.

P.6687, L.21 ; Do you mean that they are based on the use of unbiased data?

P.6687, L.27 ; "[...] by a lack of ground-based observation networks [...] (Scipal et al., 2008)." I agree with the spatial density issue, however since 2008 big efforts were made to provide ground-based observations (ISMN, <http://www.ipf.tuwien.ac.at/insitu/>, NCRS-SCAN, <http://www.wcc.nrcs.usda.gov/scan/>), I think it is of interest to notify it as several studies already showed that point scale data are able to monitor coarse scale

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soil moisture product.

P.6690, L.1-10 ; It is not the first time you mention these differences, may they can be summarize in a table.

P.6690, 2.2 MERRA data, do you plan to use other data sets, analysis and re-analyses (NCEP, ECMWF)?

P.6691, L.18-20 ; "P gauge is based on the same satellite input data (TRMM 3B42) but includes a retrospective correction based on monthly rain 20 gauge data and is therefore of higher quality than P sat" Do you have any evaluations references for this?

P.6692, Section 2.4, Wagner et al, 1999 for the TU Wien soil moisture change detection algorithm, Draper et al., 2011 and Albergel et al., 2010 for examples of use/evaluation.

Wagner, W., Lemoine, G. & Rott, H. (1999). A method for estimating soil moisture from ERS scatterometer and soil data, *Remote Sens. Environ.*, 70, 191-207.

Draper, C., Mahfouf, J.-F., Calvet, J.-C., Martin, E. & Wagner, W. (2011). Assimilation of ASCAT near-surface soil moisture into the French SIM hydrological model, *Hydrol. Earth Syst. Sci. Discuss.*, 8, 5427-5464, doi:10.5194/hessd-8-5427-2011.

Albergel, C., Calvet, J.-C., de Rosnay, P., Balsamo, G., Wagner, W., Hasenauer, S., Naemi, V., Martin, E., Bazile, E., Bouyssel, F. & Mahfouf, J.-F. (2010). Cross-evaluation of modelled and remotely sensed surface soil moisture with in situ data in southwestern France, *Hydrol. Earth Syst. Sci.*, 14, 2177-2191, doi:10.5194/hess-14-2177-2010.

P.6694, L.10-13 ; As it is a important sentence in this article I suggest to rephrase it (maybe 2 sentences) for a better comprehension (+ it is the same sentence P.6688).

P.6694, L.16 ; "satellite-base precipitation product (P sat)" Already defined, use P sat.

P.6696, L.9-10; "[...] are rescaled so that they have the same temporal standard deviation [...]" Which technique was use? please link with P.6700 L.1-2 "[...] processed to have the same temporal mean and standard deviation [...]"

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P.6698, section 3.2, Adding a table summarizing all the different scenario will help the reader.

P.6699, L.8, "root mean square error" already defined, use RMSE only.

Figures 2 to 5, please add legend on colour bar

Interactive comment on *Hydrol. Earth Syst. Sci. Discuss.*, 8, 6683, 2011.

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