

Interactive comment on “From near-surface to root-zone soil moisture using an exponential filter: an assessment of the method based on in-situ observations and model simulations” by C. Albergel et al.

Anonymous Referee #4

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Paper: From near-surface to root-zone soil moisture using an exponential filter: an assessment of the method based on in-situ observations and model simulations. Albergel et al.

This is an interesting paper on a relevant topic that is within the scope of HESS. It compares a soil water index estimated from intermittent surface soil moisture measurements with in-situ observations using information from a soil moisture stations network and from a synthetic dataset covering continental France. The main goal of this paper is to test a method to retrieve the root zone soil moisture from surface soil moisture

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information. Another objective is to optimise a critical parameter used in that methodology (exponential filter) and to investigate their relationship with soil properties and climate conditions.

COMMENTS

The title clearly describes the contents of the paper. The abstract is concise and complete. The presentation is clear and the language is fluent and precise. The methods and assumptions are valid and clearly described and could be applied by others scientists. Nevertheless, the authors should include an explanation of the advantages of the exponential filter they use compared to other methods. Data presentation is appropriate but variable units in some cases are missing. A revision of the units of each variable used can help to make some part of the paper more comprehensible. The results are sufficient to support the conclusions. The discussion section is too succinct in relation with the structure of the article. The analysis of the results might be shortened and of this form it might discuss more deeply in aspects as the optimisation of the parameter T and his correlation with other variables such as the soil depth, the soil properties or the environmental conditions.

Specific remarks

1. Introduction The units of the soil moisture variables -wg, w2, ms(ti), SWI- should be included from the beginning to help the reading of the paper and to avoid any misunderstanding.

3. Application of the exponential filter P 1614, line 2: "Moreover, undesired effects in the real data base due to local climate incidences are more pronounced in the afternoon, and were therefore avoided". The authors should be more explicit and a little explanation of such effects could be useful.

3.1. Statiscal scores Equation 7: p is not explained

4.1.1. SMOSMANIA P 1617, line 1: In this paragraph it is mentioned a possible de-

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pendence of the parameter T by the soil texture. Neither in this section nor in that of discussion (P 1621, line 11) there is an explanation on the possible influence of the soil texture. In section 4.3. the authors conclude that soil texture may not play a significant role in the determination of T but previously they stated that the lower N (Nash-Sutcliffe) values were found with coarse texture.

4.2. Impact of the soil/depth/thickness P 1619, line 18: In Figure 9 a and b are not marked

Line 22: Topt of SMOREX and the average Topt of SIM are quite different. The authors should include a statement discussing the reasons of such a remarkable difference.

5. Discussion P 1621, line 14: Reference to Fig. 10 should be replaced by Fig. 11.

Figures P 1633, Fig. 4: SWI units should be inserted in the figure caption.

P 1634, Fig. 5: The left axis label should be N instead of Nash. In the figure caption N in brackets should be inserted after "Nash-Sutcliffe score".

P 1635, Fig. 6: The left axis label should be SWI instead of soil moisture. In the text Soil Water Index should be written instead of "Soil wetness index".

P 1636. Fig. 7: The figure is not clear and it is difficult to identify the patterns of the results. The authors could try to increase the size by restricting the image to the France border strictly.

P 1637, Fig. 8: Axis labels are missing. SWI and soil moisture units are missing.

These remarks do not affect in any way the argument and conclusions of the paper. I therefore recommend that this paper be accepted for publication after minor revisions.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 1603, 2008.

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