

## ***Interactive comment on “Assessment of soil moisture fields from imperfect climate models with uncertain satellite observations” by G. Schumann et al.***

**Anonymous Referee #1**

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### General Comments

The paper addresses the important issue of how to uncertain remotely sensed soil moisture data can be used for evaluating uncertain land surface models. The main idea of the authors is to introduce fuzzy logic, whereby the membership functions are constructed by using two independent remote sensing data sets. This idea is new to me and appears very attractive. However, the paper is very short and does not present the results in sufficient detail in order to allow the reader to assess the value of the method. Many statements are also very speculative. My recommendation is therefore that the authors significantly expand the paper (in particular, the methodological section

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and the results section should go much more in depth) and carefully reconsider their conclusions.

### Specific Comments

1. The model simulations and the remotely sensed data represent different soil layers. How does this affect the results?
2. Both the regional and global models built upon MOSES. Spatial and temporal patterns of both models should be shown to understand the differences between them.
3. Soil moisture values are averaged over one month. Given the different sampling intervals and the high variability of surface soil moisture, should this not introduce major uncertainties?
4. In particular, the ERS coverage of Europe is much poorer than for AMSR-E. How does this affect the results?
5. Both the active and passive measurements represent the same soil layer. So why are two different ranges given for the penetration depth of ERS and AMSR-E?
6. The satellite data are affected by snow and frozen soil. Where these erroneous measurements excluded, and if yes, how?
7. Satellite retrievals are characterized by error intervals. Should this error interval not be considered in equation (1), e.g. by making the trapezoid wider?
8. What are the P values in equation (2)? I presume it the same as A in equation (1)...?
9. Without seeing much more extensive results, the discussion in Chapter 4.1. is very speculative. In particular, just based on this very coarse scale comparison, are the authors really in the position to comment on the physical appropriateness of the satellite retrievals?

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10. In section 4.2. the authors note that the improvement of LAM over GCM is striking. Sorry, but I do not see this in Figure 5.

11. The authors state at the end of section 4.2. that improved runoff processes are more important than improved evapotranspiration. Which results of this study justifies this statement?

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