Hydrol. Earth Syst. Sci. Discuss., 5, S580–S582, 2008
www.hydrol-earth-syst-sci-discuss.net/5/S580/2008/

Hydrology and Earth System Sciences Discussions

Interactive comment on "On the comparison between the LISFLOOD modelled and the ERS/SCAT derived soil moisture estimates" *by* G. Laguardia and S. Niemeyer

Anonymous Referee #2

Received and published: 2 July 2008

GENERAL COMMENTS

This paper compares soil moisture from the LISFLOOD model, a continental scale rainfall-runoff model, and from ERS scatterometers, a coarse resolution active microwave instrument. The subject is of great interest for the audience of HESS as its findings influence two areas of active research which currently receive much attention. First the forecasting of floods on a continental scale and secondly the retrieval of soil moisture from coarse resolution microwave observations.

A relative weakness of this paper is its lack of a comprehensive scientific discussion. Differences in the datasets are presented without indepth analyses of the causes. The

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contribution of the paper to our understanding of the characteristics and limitations of each datasets is therefore limited and no substantial conclusions are presented.

SPECIFIC COMMENTS

1) The paper is in most parts well structured and contains all the necessary information. However the introduction would need a major revision. It would be helpful if the authors make a clear statement about the research questions they want to follow up and how they address these questions. This should be followed by a review of state of the art results and methods and a clear statement of how the results of this study add to our knowledge.

The introduction should also be limited to the main subject of the paper. Currently the introduction is merely a listing of common knowledge which is not up to date and does not contain any substance. For example: A) The authors limit their review of soil moisture remote sensing to approaches relying on optical/near infrared observations. Today it is largely agreed that these methods hold little potential for soil moisture retrieval and research focuses on the microwave domain. Also the respective discussion seems a bit out of focus considering that the authors actually use data from an active microwave instrument. A review of recent developments in this area would be more helpful. B) Similarly in the section dealing with field campaigns the authors miss to address the latest developments (OK Mesonet, AMMA, SMOS-REX). C) Finally it seems a bit strange that the authors rely on studies dating back as far as the 80s. It is hard to believe that there was no progress during the last 25 years.

2) In section 3 the authors use the LISFLOOD soil data to transform the SWI into available soil moisture. This has the effect that both data sets are not longer independent. The effect of this transformation on the estimated statistics has to be discussed in detail. Wouldn’t it be more effective to transform the LISFLOOD soil moisture to SWI units. This way both datasets would remain independent.

3) To study the effect of the scale mismatch semi variograms are calculated. However

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the results are presented without any critical discussion and/or interpretation. Do the two datasets represent a different scale and which consequences does this have for the comparison. How much of the difference in the two data sets can be explained by the scale mismatch? In the conclusions it would also be interesting if the authors could make a statement about what this means for the application of the scatterometer data for hydrologic applications. Is it a useful dataset considering the coarse resolution?

4) Confidence intervals should be given for the derived statistics. Currently it is difficult to asses which differences in Fig 9 to 14 are significant.

5) The conclusions are quite shallow. Apart from the observation that both datasets agree well over large areas, what can we learn for the future improvement of the LISFLOOD model and the scatterometer data? Do the statistics tell us anything about the forecast skill of the model? How can we use the results to improve the model.

TECHNICAL COMMENTS

6) Abstract. In the abstract in what units is the RMSE.

7) Section 2. What is the layer depth of the LISFLOOD model. This is important to understand how the two datasets relate to each other

8) Figures: All spatial plots are of poor quality. For example use colour classes instead of the continuous colour bars (this would allow to better distinguish different categories).

9) What are the red crosses in figures 9-14

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 1227, 2008.