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Interactive comment on "Streamflow data assimilation for soil moisture analysis" *by* K. Warrach-Sagi and V. Wulfmeyer

Anonymous Referee #2

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This paper proposes a method to assimilate observed streamflow data into a spatially distributed land-surface model in order to improve the initial soil moisture conditions for a NWP model. The assimilation scheme is tested in a well observed catchment in Germany. The presented results of the updating procedure are promising and in my opinion this paper is worth to be published, if the authors include some additional explanations.

Page 558: 1. The EnKF

The authors have implemented a 'retrospective' EnKF formulation. During the updating time window each of the ensemble realisations uses the same input data (climate variables)? What does this mean for the ensemble spread of the simulated runoff at the gauging stations? For clarification an additional figure with ensembles of simulated

streamflow and mean soil moisture (i.e. maximum,minimum,median) for the retrospective updating time window could be added.

Page 560: Set-up of the OSSE

The authors use the simulation results of Warrach-Sagi (2008) for the assimilation experiment instead of real stream gauge data in the study catchment. This assumption is acceptable in this framework. However, the aim of the presented updating scheme is to assimilate real-time stream flow measurements into the LSM in order to obtain appropiate soil moisture patterns. Therefore a short discussion about the meaning of this additional uncertainties (particularly for time periods with under- or overestimation of the runoff) for the updated moisture patterns should be added.

Figures 5-11

In all of the figures the 'Background' panels show the moisture conditions at the beginning of the retrospecitve updating time window (t0). The control and the analysis panels are shown for the end of the updating period (t0+48h) - is this correct? For clarification please add a explanation in the text and figure captions.

Interactive comment on Geosci. Model Dev. Discuss., 2, 551, 2009.