Hydrol. Earth Syst. Sci. Discuss., 12, C1172–C1173, 2015
www.hydrol-earth-syst-sci-discuss.net/12/C1172/2015/

Hydrology and Earth System Sciences
Open Access
Discussions

Interactive comment on "Data assimilation in integrated hydrological modeling using ensemble Kalman filtering: evaluating the effect of ensemble size and localization on filter performance" *by* J. Rasmussen et al.

Anonymous Referee #2

Received and published: 20 April 2015

A nice and well written paper. The evaluation of ensemble size and localization techniques have been done before for many applications, but not often for integrated hydrological models with a very limited amount of measurements. When the spatial coverage of the data is poor, the data assimilation method has a more difficult job to do. As a results the effect of the chosen localization technique is often more pronounced and a larger ensemble size is usually required to obtain accurate results. Although this insight is not new, in the paper this effect is quantifies in a number of different data assimilation experiments. Therefore the paper is certainly worth publishing.

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

The paper describes only twin experiments with generated measurements. I agree with the authors that this is the best way to obtain quantitative insight into the data assimilation methodology. With respect to the performance indicators described in Section 2.8 the role of the third one is not clear to me. Why not focus on the first two indicators: The head and discharge RMSE?

The paper is rather self-contained and provides a very brief overview of the various components of the methodology. For the technical details the reader has to study the various references mentioned. I only missed a general discussion about Ensemble Kalman filtering algorithms. At the beginning of Section 2.3 without any introduction the Ensemble Transform Kalman filter is described. There are many Ensemble Kalman filter algorithms available. Why is this implementation used?

There are a few small mistakes in the paper. Page 2286 Fig. 1 should be Fig. 6 and page 2287 Fig. 7 should be Fig. 8. The quality of the Figures 6 and 8 is not good. It is quite a puzzle to reconstruct the results from these figures. Increasing the size and/or less lines per Figure might help here.

The fact that in a few experiments the RMSE increases with the ensemble size is worrying (Fig. 6 bottom). The explanation in the paper (page 2286, lines 23-27) is not very convincing. And what would be the RMSE for ensemble sizes larger then 200 in these cases?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 2267, 2015.