

# ***Interactive comment on “Identification of hydrological model parameters variation using ensemble Kalman filter” by C. Deng et al.***

**Anonymous Referee #2**

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Dear Authors! This paper focuses on the identification of the variability and change of model parameters with over a long time period. A parsimonious rainfall-runoff model on a monthly time step with only two model parameters was used in this study. An EnKF approach is used to update the model parameters based on the observed runoff. This method is applied for a synthetic experiment and two case studies in China. The aim of the study is to show the capability of the EnKF approach to estimate the model parameters and their change over time. In my opinion this is a very promising and important issue and additional research in this field is important. Going through this specific paper about parameter estimation I was thinking that this is more a draft or concept version of a publication, than a paper ready for submission. The introduction and the comparison with other studies should be deeper than in this version. And the benefits of the specific EnKF approach used in this study are not clearly supported

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by the results of the synthetic experiment and the two real case studies in China. In general my opinion about the scientific quality of this publication is in line with that of reviewer #1. A lot of additional work and analysis have to be included before this work should be published. I do not go very much into the details, but my major concerns are: -) The introduction and literature review should be extended – broader context -) The superior performance of the EnKF method was not obvious to me. A comparison with other sequential data assimilation techniques would have been helpful. At the other hand I didn't quite understand what the real benefit is – if the parameters are estimated from observed discharge data in the past, but the performance of the model is not tested for the “forecast” or “prediction” case when no runoff measurements are available. In my opinion this should be the most important indicator for the added value of the data assimilation routine. -) Looking at figure 11, it is really not clear to me how the data assimilation approach could help to estimate appropriate model parameters when the 95% uncertainty bounds are much smaller than annual and inter annual variations of the evapotranspiration parameter C. To summarize, I suggest major revisions before this paper should be published and the benefit of the proposed method can be presented to the international scientific community.

Best regards

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