

Interactive comment on “Variational assimilation of remotely sensed flood extents using a two-dimensional flood model” by X. Lai et al.

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Received and published: 24 July 2014

This paper proposes to assimilate a direct observable flood variable from satellites, namely flood extent, in 2D flood models using a 4-D var method.

I reviewed I think all of the previous versions of this research work by the authors and I have to say that this one is a great improvement from the previous versions in which the authors actually addressed most of the reviewers' comments very carefully. Introduction to the problem as well as description of methods and result analysis has much improved.

I believe that after addressing some relatively minor concerns, this paper may be published.

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Comments:

- Please explain the alpha scaling parameter better when you talk about stage and velocity being assimilated together. I can't really follow on page 6935.

- Figure 10. I think this figure is a bit confusing and unclear at the moment. It would be helpful to plot the MODIS flood extent at $\text{thr} = 126$ on there as shown in figure 9.

- I still have two major points of concern regarding the results:

- 1) The RMSE in water depth are extremely low, we are talking less than mm. Am I reading these numbers correctly? If so, how can this be physically meaningful and why should we care then? Sorry if I misunderstood these RMSE numbers (Table 3 for example). Please explain

- 2) To my knowledge the obtained floodplain roughness after assimilation is really high. Is this realistic, physically? Maybe it's worth describing what the floodplain vegetation is but given that MODIS observed flooding the vegetation cannot be completely dense forest for example

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 6923, 2014.

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