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Hydrology and Earth System Sciences Discussions

Interactive comment on "Assimilating in situ and radar altimetry data into a large-scale hydrologic-hydrodynamic model for streamflow forecast in the Amazon" *by* R. C. D. Paiva et al.

Anonymous Referee #2

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This study describes the application of a data assimilation scheme in a hydrologic-hydrodynamic model that ingests in-situ and remote sensing observations of discharge and water levels in the Amazon River. The topic is very interesting and appropriate for HESS, while the methodology is generally sound. However, there were certain issues that either need to be clarified or be redone. - My major concern is with the calibration and validation periods. From the text it seems the model was calibrated using data from the entire period 1998-2009, while the validation period was 2004-2005. Why were the validation years included in the calibration period? How would the results change if these years were left out? I would recommend that the analysis be redone, at least

for one of the experiment setups. Also, in section 3.3 it is not entirely clear which stations were used for either calibration or validation. During assimilation, no rationale is given to which stations were selected as observations to be assimilated, and which were kept for validation. Were experiments with different subsets performed? Either some justification for the selection of stations needs to be given, or more experiments need to be performed. It would be helpful to add some quantitative information in the abstract. - The paper needs to be be proofread, there were a number of grammatical errors, e.g. "and discharge with minor degree" should probably be "and discharge to a minor degree" in the abstract. - p. 2882 "spatial resolution": I think the authors mean "coverage". - p. 2887 "the forecast errors": these are not usually termed forecast errors, rather they are "model innovations" (actual minus predicted measurement). - p. 2888 "In [the EnKF[method... model states are perturbed": the perturbation of model states is not a requirement, there are a number of different methods to generate an ensemble. In fact, the authors perturb the forcings to generate the ensemble of model states. I suggest replacing this with "ensembles of model states (and in some cases observations) are generated". - p. 2888 "of P are not required": do the authors mean the analysis model error covariance Pa? - p. 2890, l. 4-5: why are observations expressed as perturbed values? Since the square root version of the EnKF is used, observations don't need to be perturbed? Were they perturbed prior to assimilation? - p. 2893 "results were improved in the second experiment": so far, there has been no mention of experiments. Which one is the "second experiment"? - p. 2894, l. 11: I don't think the word "sensibility" can be used in this context, probably meant "sensitivity"? - p. 2895, l. 10-14: how were 12 ensemble members used from years up to 2004? Were years from the future used as well? Was the actual forecast year used? - p. 2896, l. 20-25: are there any rain gauges available to test the result for the optimal precipitation error? It would be valuable to have an idea of whether the 50% value is close to the actual precipitation errors. - p. 2901, l. 1-6: I realize the dataset is referenced out, but it would be worth mentioning if the altimetry-derived discharge contains any in-situ information or is just derived from a model and the actual ENVISAT data. - p. 2901, l.

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Interactive Comment

18-20: were these stations used in the assimilation?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 2879, 2013.