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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Operational reservoir inflow forecasting with radar altimetry: the Zambezi case study" *by* C. I. Michailovsky and P. Bauer-Gottwein

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Review of the paper entitled 'Operational reservoir inflow forecasting with radar altimetry: the Zambezi case study' by C. I. Michailovsky and P. Bauer-Gottwein

This is an interesting and timely topic. This paper describes the use of water levels from radar altimetry data of the Zambezi basin in assimilation to an operational reservoir model in order to improve inflow forecasts.

This is a worthwhile addition to the authors' previous work on this topic and in this study area and the paper falls well within scope a=of HESS and should be published after

the following concerns are addressed:

- P9616,L5: please replace optimal with improved since an optimal forecast of flows is governed by optimal forecasts of initial boundary conditions to the model, such as precipitation, which in this case. is independent of water level assimilation

- P9616,L12/15: I feel these sentences are contradicting: first it is argued that radar altimetry is difficult to be used operationally (which I agree) but then the following sentence states that the use of radar altimetry can overcome this limitation. I imagine I know what the authors mean here but please consider revising this.

- P9616: Why was the initial performance of the model so low (NSE 0.2)? I assume this is because of the large error in precip forecasts? If so, this is worth emphasizing in the abstract.

- P9619,L9: Please write 'through storage and evaporation', flow dampening is primarily through temporary floodplain storage of water coming from the river

- P9621,L12/13: is there a paper reference that could be cited here to back up the statement that groundwater parameters are the most sensitive ones?

- P9623,L21-25: if the SRTM DEM is available, why not use the real floodplain geometry at each side of the reach thru a 1-D extended cross-section approach for instance?

- P9624,L7-9: are these low and high flow widths from Landsat different enough? In some rivers in the world this approach would be limited since widths might not change much (e.g. Amazon or engineered river bank systems)

- P9626,L4/6: In these equations, I assume w (bottom width) is taken as the low water Landsat image-derived width; there is certainly a considerable amount of uncertainty in this assumption given that your bottom width might be significantly overestimating very low flow (i.e. at zero depth). How do you account for this?

- P9626,L7-10: am I correct in assuming here that you adjusted the altimetry readings

to your modeled depths? In this case, the observations are not really independent from the model anymore, how does this affect the assimilation? Would you make it all work in favor of the exercise so to speak?

- P9630,L1-3: again, same comment as before: here it is worth briefly explaining why the prior NSE is so low (0.2)?

- P9631,L25: Essentially, as is illustrated by watershed 2, if initial conditions are already quite good leading to acceptable prior model performances, assimilation does not help much. This is of course expected but I think is worth noting in the conclusion that assimilation is really powerful when initial conditions are poor (as illustrated by the case of watershed 1).

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 9615, 2013.