Hydrol. Earth Syst. Sci. Discuss., 10, C6032–C6034, 2013
www.hydrol-earth-syst-sci-discuss.net/10/C6032/2013/

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

C. I. Michailovsky and P. Bauer-Gottwein

claire.michailovsky@gmail.com

Received and published: 31 October 2013

We would like to thank Anonymous referee #2 for reviewing the paper. This response aims to address the comments provided.

- Unless I missed it, I didn't see much on how the calibration was performed. Relevantly, was there any thought put on using the assimilation itself to perform the calibration? Regardless, I think there should be some discussion of that possibility.

The calibration consisted of two parts: that of the RR module and that of the routing and floodplain parameters. For the RR module, the calibration was performed using

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

manual trial and error using in situ flows where available, focusing on the parameters mentioned in the manuscript. The assimilation was not used for calibration because the assimilation focuses on levels and the desired output is flows. A flow calibrated model was needed as a starting point for the assimilation. However, the altimetry levels were used in the calibration of the routing parameters.

- The first paragraph of the abstract seems rather disjointed. I would probably start with the second paragraph or rewrite the first one to be more cohesive.

The first paragraph will be changed in the revised manuscript.

- p. 9624, l. 2: shouldn't h_{fp} be at the bottom of the floodplain in Fig. 2 instead of the water elevation in the floodplain?

h(fp) is water level, which is equal to the elevation of the bottom of the floodplain at the edge of the flooded area.

- p. 9624, l. 7: a reference or more detail on how the widths were extracted from Landsat imagery would be helpful here (doesn't have to be long).

In order to reduce uncertainties, the widths were extracted by measuring the open water area in the zone where the satellite crossings occur (usually along a few km) as well as the centerline length over the same area and dividing the area by the length to obtain the width. This information will be added to the manuscript.

- p. 9624, l. 17: maybe switch lines 19-20 at the beginning of this section to define what a Kalman Filter does.

The beginning of the section will be rephrased in order to define what the Kalman Filter does from the start.

- p. 9625: there is not much on the dimensionality of the problem, which is what plagues the application of the EKF generally (with the inversion of the covariance matrix). Please add the pertinent information.

HESSD

10, C6032–C6034, 2013

The dimensionality of the problem is quite low: two states are needed per reach modeled (one for the storage in the reach and one for the modeled error) plus one state per reach including a floodplain. In this particular application this brought the number of states to 32. Information will be added to the manuscript.

- p. 9627, l. 5: need to explicitly say whether the estimation of model errors was done only during the calibration period. It seems like it, but if not I strongly recommend that it be done that way.

This is indeed the case. Information will be added to the manuscript.

- Fig. 3-5: I would use the terms "Prior" and "Posterior" instead of "Deterministic" and "Assimilation".

Yes, the terms prior and posterior are more appropriate, the figures will be corrected.

- p. 9630, l. 19-25: why wasn't the implementation of these errors attempted. This is a very interesting hypothesis, and unless it's too much effort I think the paper would greatly benefit from the demonstration of its testing (even one of these error sources).

Trying to implement these errors has proved more complex than we initially thought because the ET factor is multiplied by the floodplain area (which is based on the floodplain state) and perturbing it would require alterations to the current formulation of the assimilation scheme. The errors will therefore not be implemented and the manuscript will be modified to reflect this complexity.

- p. 9618, l. 8: replace "is" with "are".

Change made.

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