Hydrology and Earth System Sciences

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Discussions

Interactive comment on "Kalman filter approach for estimating water level time series over inland water using multi-mission satellite altimetry" by C. Schwatke et al.

Anonymous Referee #2

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The manuscript by Schwatke et al. is of major importance since it presents new results for the monitoring of lakes and lakes that look to be a dramatic improvement (much lower rms in comparison with in-situ series) with respect to existing databases. Consequently, the paper deserve publication but it is not acceptable in the present state. Major points have to be improved.

The presentation of the results is not clear in the sense that their methodology merges three aspects : 1- the use of a "homemade" retracking of the radar echoes 2- replacement of the true data value by one predicted through a Kalman filtering. 3- fine rejection of the outliers

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And It is absolutely necessary that the part played by each of these three points in the final improvement is better stated since these 3 points more or less make the difference between the existing website cited in the paper (some use GDR retracking when other use their own retracking, some have a refined detection of the outiers in the raw data when others are more loose on this question, some publish all the values obtained after the post-processing step when other reject dubious values, ...). In other word, Authors mustshow how much improvement is due in the present study to the retracking of the radar waveform, how much is due to the Kalman filter ?, and how important is the choice of the "valid" points ?

According to the Title, the Kalman filter seems to be the major source of improvement. If it happens that the retracking algo and/or outlier detection play an important part in the improvement, maybe the title should be changed to take it into account.

The question of the biases is not clear. Authors should -as least briefly- state how they evaluated the biases for the tracker that they use, for each mission (were they estimated globally prior the compuation of the series?, are they evaluated separately for each series merging several missions?), And -in the case of global values- publish the values

The authors mention in the Introduction the key point of the slant measurements (off-nadir measurements). But they do not explain how they deal with it. Do they ignore it ? If not, where is it corrected for? In the pre-processing step ? How is it modelled (best fitting parabola, parabola constrained by geometrical considerations?, other analytical expression?, etc ..)

Legends in the Tables are not complete. For example, in Table 4, what does the N stand for (number of cycles ?) ? Besides, it woud be useful to indicate the mission (Jason-2, Envisat, ...). Also, the river widths do not correspond to actual widths of the reaches. Is it the length of the track segment ? Figures showing comparison of time series are not easy to read. For exp, in Figure 9, it is not possible to see if points are

missing or hidden by others. Authors should seek for better way to show all the series in a single view (points in the background larger than the points in the foreground, or use different symbols ....)

I don't comment the English which is better than mine ...

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