Review for the revised version:

Satellite radar altimetry for monitoring small river and lakes in Indonesia

By

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Anonymous (Reviewer)

General comments

One of the basic premises of this study is to improve the returned RADAR altimetry echoes/waveforms from inland water bodies by carefully filtering out the non-water surface affected waveforms. Authors used these filtered waveforms after removing the outliers to monitor surface water levels and validated these space based measurements with the in-situ measurements. Currently, the operating altimetry missions were primarily designed to study the ocean surface levels. However, retracking the waveforms returned from overland allows altimetry data to retrieve surface water levels for the small water bodies and narrow rivers. Authors propose to classify the retracked waveforms into categories that primarily based on the reflectance characteristics of the inland water bodies (river and lakes). They consider the fact that inland waters are smoother than the ocean surface so as the reflectance are more mirrorlike from the inland water bodies than the diffuse reflectance coming from the ocean surface. They hypothesized four characteristic waveforms from inland bodies based on landsurfce/vegetation and boundary conditions and chose two appropriate waveforms as qualified waveforms for the retrieval of surface water levels. They test their approach to monitor surface water anomalies from a small river (40-200 m), a medium river (200-800 m) and two lakes (<1000 km2) in Indonesia, a tropical part of the world.

Given that I still have some concerns on the followings:

As has been documented by previous authors, the retrievals of water level become extremely challenging even for a medium size river (40-800 m). In this manuscript, authors also experimented on the river level retrievals in which the river widths varied from 8-45 m. In this experiment, the authors cannot even identify the crossing point from the Landsat data (resolution 30 m). The authors' use 1 m pan-sharpened IKONOS data to identify the crossing point between the river and the altimetry ground track. No Validation has been carried out. As far as I see, there is so much of uncertainty of their experiment for the water level retrievals for widths between 8-45 range. Furthermore, the comparison of the water level anomaly data and with the TRMM data (Figure 8) does not provide any added information to the manuscript. It is very hard to see if there is any correlation between these two variables. So, would you please provide any single reason that why you need to keep this section in this manuscript? (Line no 8, Page 10)

Some minor comments are given below.

Specific comments:

Page 10:

Line no 6: I see roman numerals (i) in the text in line no 16 in page 10. There is no continuation of that numbering system further in that paragraph. Please either continue it or remove it from the text.

Please provide the (a), (b)...(h) numbering for the different tiles in Figure 3. Please refer each figure number when you discuss it in the text.

Furthermore, I would like to mention here that Michailovsky et al. (2012) provided the highest weight coefficient to water waveform, whereas other waveforms get lower weight coefficients in their approach to select the most appropriate waveforms that are less contaminated by land. Any comments about the pros and cons between two approaches are helpful for the readership. They also have an outlier removal methods based on the statistical properties of the waveforms.

Line no 22:
Page 11
Line no 11: Citation for the reference is not correct. The "deSa, 2007" needs to be corrected as "de Sa, 2007".
Furthermore, this citation is also not correctly given in the reference section. The correct reference should be as follows (Please format it according to the journal style):
De Sá, J. P. M. (2007) Applied Statistics Using SPSS, STATISTICA, MATLAB and R. 2nd edition. Springer-Verlag, Germany.

Page 12
Line no 28: please replace "best" from "better"

Page 13 and Page 14
Line no 27-4: I strongly question about the section from Line number 27 (page 13) - 4 (Page no 14). This section does not add anything to this manuscript. It is questionable on how authors can make a recommendations based on something that they have not really shown in the manuscript.

As authors pointed out in their manuscript, the footprint of the Envisat is ~850x2 m (Line no 8, Page 10). As has been documented by previous authors, the retrievals of water level become extremely challenging even for a medium size river (40-800 m). In this case, authors are experimenting on river widths ranging from 8-45 m. Authors even cannot identify the crossing point from the Land sat data (resolution 30 m). The authors' in this case use 1 m pan-sharpened IKONOS data to identify the crossing point between the river and the altimetry ground track. No Validation has been carried out. As far as I see, there is so much of uncertainty of their experiment for the widths between 8-45 ranges. Furthermore, the comparison of the water level anomaly data and with the TRMM data (Figure 8) does not provide any added information to the manuscript. It is very hard to see if there is any correlation between these two variables. So, would you please provide any single reason that why you need to add this section into this manuscript?

Line no 18/19: Please either use Fig. x or Figure x. Please be consistent with whatever you selected throughout the manuscript text.