

Interactive comment on “Flood frequency mapping of the middle Mahakam lowland area using satellite radar” by H. Hidayat et al.

Anonymous Referee #2

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In the article, authors proposed a study aiming at mapping flood frequency in an Indonesian catchment using Alos PALSAR image.

This article is clear and well written. The study is especially interesting because it shows the interest of using RADAR L-band images to map flood extent where ground measurement and observation with comparable synthetic view is impossible.

One of my concerns is about the term flood frequency that is often use in the article. Indeed, It is hard to argue that series of images could provide flood frequency especially considering that the time separating two image acquisitions is not constant at all. As a matter of fact, the article deals more with the extraction flood map time series using SAR images. In my opinion, authors might at least discuss this point since the

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statistical meaning of flood frequency does not match with the use of these terms in the article. Moreover, in figure 8, 9, 11, 14 and 15, numbers between 0 and 20 are not flood frequencies.

The abstract reflects correctly the content of the article. The introduction is clear and well written but I would suggest to put more emphasis on presenting the interest and the applications of such a study. I would also add a paragraph about the state of the art with respect to the methods that can be used for flood mapping. You can find information and references for instance in Matgen, P., Hostache, R., Schumann, G., Pfister, L., Hoffmann, L., Savenije, H., 2011. Towards an automated SAR-based flood monitoring system: lessons learned from two case studies. *Phys. Chem. Earth* 36 (7-8), 241–252. and Hostache, R., Matgen, P., Schumann, G., Puech, C., Hoffmann, L., Pfister, L., 2009. Water level estimation and reduction of hydraulic model calibration uncertainties using satellite SAR images of floods. *IEEE T. Geosci. Remote* 47 (2), 431–441.

The methodology part is in my opinion not detailed enough. Indeed it is not really clear for me how the threshold values have been defined. Especially I think it could be interesting to discuss and motivate the choice for the threshold values that have been used. Would it be possible to discuss also the sensitivity of the maps to the threshold values. There are no argument regarding the choice of the threshold values. This is really lacking.

The result and discussion part is interesting but can be improved as proposed hereafter. The conclusion is satisfying in my opinion.

Some additional comments are proposed below:

1. Please add color stretch legends on figures when needed
2. p 11525 l 13: maybe replace polarity by polarization
3. p 11526, l 5-11: please discuss how you choose the threshold values and what

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the proposed value means. Why considering the mean backscatter in the floodplain for flooded vegetation detection ? Please justify and explain. Maybe add here the threshold numerical values. Please explain why you remove areas with elevation higher than 24 masl.

4. p 11526, l 19-21: Please clarify this sentence. Why didn't you use temporal filtering ?

5. p 11527, l 3-16: Here I don't really see why the pixel backscatter values and the water depth might be correlated. I understand that there is a strong variation of backscatter when a pixel is flooded but how the water depth can induce backscatter change. Please explain why you are looking for such a correlation.

6. p 11528, l 15: It seems that the way you determine threshold is not consistent with what you presented in the methodology part.

7. p 11530, l 4: I do not understand what "by frequency mapping" means.

8. Figure 5. Are radar backscatter mean values or pixel values ?

9. Figure 6. Please render this figure lighter.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 11519, 2011.