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Hydrology and Earth System Sciences Discussions

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

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We would like to thank Anonymous Referee #1 for the assessment of our paper on flood frequency mapping of a tropical lowland and for his/her comments about the manuscript. Replies to the comments are given below.

Comment: p. 11523, l. 13: what is meant by 7.8% partial agreement?

Reply: Hoekman et al. (2010) defined partial agreement as confusion with an adjacent class along a continuum, with a fairly similar biophysical characterization. Partial agreement may be related to the dynamic behavior of low biomass areas. In Borneo,

these areas may change drastically over the year. Even though the validation data set is based on (optical) observations of the year 2007, the time-lag with the radar observations may be several months. Moreover, the radar classification is based on a multi-temporal observation (dry and wet season) and not on a single observation. The main cause of partial agreement, however, is confusion along biomass and fooding continua, such as the confusion between riverine forest and riverine shrub, and the confusion between different types of peat swamp vegetation. We will add an explanation regarding this issue in the revised ms.

Comment: p. 11527, l. 1-10: please give correlation values within the text here, rather than just saying high or poor correlation, also on p. 11528, l. 26 and p. 11529, l. 11

Reply: We provide the correlation values in the revised ms. On p. 11528: For lakes and shrub covered floodplain peatland, where the range of water level variations was large, high water level-backscatter correlations of 0.87–0.98 for the lakes and 0.72–0.99 for the floodplain peatland were obtained. In forest covered peatland subject to a small range of water level variation, water level-backscatter correlations were poor (r = 0.18–0.48). On p. 11528: Overall, flood frequency was well-correlated with lake depth (Fig. 10) resulting in r values of 0.83–0.85, deeper areas were more frequently flooded than shallower areas at the shore and near islands. On p.11529: Depth-frequency correlations remained relatively high (r=0.82) for Lake Melintang but dropped (r=0.39–0.54) for all bathymetry sections in Lake Jempang.

Comment: p. 11528, l. 15: how does this range of dB compare to values for flood detection for L-band found in the literature? Also, similar comment on p. 11530, l. 5 in relation to flooded vegetation?

Reply: We add these comparisons in the revised ms. on p. 11530: Our upper threshold of -11.2 dB for flooded nonvegetated area is relatively high compared to

those obtained by Hess et al. (2003) using JERS-1 SAR for the Amazon, where backscatter value of less than -14 dB are classified as open water at both high and low water. On p. 11530: Using JERS-1 SAR for the Amazon, Hess et al. (2003) obtained the ranges of -7.8 to -14 dB and -8.5 to -11 dB for flooded herbaceous cover areas at high water and at low water, respectively. They also found a threshold of -6.5 dB separates flooded from nonflooded forest.

Comment: it might be worth saying somewhere in the text how much of the total area was inundated how often (in %); in other words the authors should try and quantify what is expressed in color shades in Fig. 15.

Reply: We add these details on p. 11530: From Fig. 15, it can be inferred that at least 91% of the mapped area was inundated during the wettest period and only about 12% of the mapped area was inundated during the driest period.

Reference

Hess, L. L., Melack, J. M., Novo, E.M.L.M., Barbosa, C.C.F., Gastila, M. : Dual-season mapping of wetland inundation and vegetation for the central Amazon basin, Remote Sensing of Environment, 87, 404—428, 2003.

Hoekman, D. H., Vissers, M. A. M., and Wielaard, N.: PALSAR Wide-area mapping of Borneo: methodology and validation, IEEE J. Sel. Topics Appl., 3, 605—617, 2010.

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