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Discussions

Interactive comment on "Integrated radar and lidar analysis reveals extensive loss of remaining intact forest on Sumatra 2007–2010" *by* M. B.Collins and E. T. A. Mitchard

Anonymous Referee #4

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General Comments

I think this manuscript is in good shape and could be published with only a few corrections/edits. The study is a relatively novel approach to monitoring deforestation and loss of above-ground biomass (AGB) using a combination of Lidar and SAR sensors. It is also providing valuable monitoring of the high rates of deforestation occurring in Sumatra, around a protected peatland area. I think the authors provide a nice introduction of the literature and useful discussion highlighting the practical value of their study. At times the description of each Task and comparison to previous studies can be quite ponderous, but are no doubt important to be included. The methods are clear, though I have some questions/comments about them below. Tables and Figures are

well presented and helpful. I provide more specific comments in the next section.

Specific Comments

I do have some concerns that the authors are relying on a height relationship derived for a different forest, creating the relationship between plots over peatswamp forest and then using that relationship to predict AGB across a range of forest cover types, including mangroves! Concerning mangroves, I would expect those areas to have been blocked out during the author's removal of flooded forest areas and would not expect them to be included in these emission estimates. I will say their monitoring plots are quite odd, only measuring 0.25 ha and only trees > 15 cm. Most AGB values report trees from >10 cm DBH. Do the authors have a published study they were basing this method on? I was also surprised that they used allometric equations from Chave et al (2005) when he has provided a more up to date set of equations in 2014. I appreciate they have discussed their errors and as they are reporting conservative deforestation estimates, I think each of these are minor issues. However, standardized forest mensuration data can be useful for future comparative studies and therefore should be preferred over seemingly unique methods.

Section 2.4.2, I think the authors mean the opposite of what they say. By excluding Lorey's height of <20m they are removing areas they assume to be plantation rather than natural forest.

Section 2.4.3, I would expect AGB values for peatland forest to be less than generic Asian forest. Do the authors wish to compare their plot values to reported peatland forest? Or are they correcting for not including trees between 10 cm - 15 cm DBH?

Section 2.6.1, Regarding radiometric correction of SAR data, it is unclear to me why the authors wouldn't focus on pixels of no change to generate this relationship, rather than include areas that have been deforested? It must have been possible to identify a subset of the images that have not changed.

Section 2.7, in at least three different locations in this manuscript the authors mention the relationship between Lorey's height and HV backscatter and have stated it is "non-linear" and "approximately linear". If this is because they are referring to the relationship between their plot-level Lorey's height estimates or the lidar based estimate and HV-backscatter, this should be made more explicit.