# Interactive comment on "Canopy Area of Large Trees Explains Aboveground Biomass Variations across Nine Neotropical Forest Landscapes" *by* Victoria Meyer et al.

**Anonymous Referee #2**

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General comments: This paper presents an interesting new method for estimating aboveground biomass from Lidar data, the Large Tree Canopy Area metric, which is particularly interesting as it sits between area-based metrics and tree-centred approaches. For this method to be useful, it must either (1) outperform existing methods, (2) perform similarly to existing methods but at lower computational cost or (3) open up new applications not allowed by existing methods. The paper is framed around comparing the new LCA method against the existing MCH method, but a clear comparison of the two against ground-based validation data is not presented. From Table S3 it looks like MCH performs better in terms of RMSE and Rsq when wood density is not used (but with higher bias?), and LCA and MCH have similar performance when wood

density is used. Much of this paper compares biomass estimates from LCA and MCH, and finds that LCA is a good estimator of MCH. Is LCA quicker to calculate than MCH? It would be useful to present a comparison of the computational time taken to calculate LCA versus MCH. To me, the most compelling reason to use LCA is that it gives more information about forest structure than MCH. The application to detect the impacts of selective logging is potentially very important.

My main suggestion to improve this paper are to concentrate on testing the relative performance of LCA and MCH approaches at estimating biomass when validated against inventory data (even if LCA performs worse, this is still a very useful result for method development), and comparing the performance of the two approaches when applied to detect the impacts of selective logging. I agree with reviewer 1 in that I don't see much value in testing the performance of LCA against biomass estimates using MCH.

Specific comments: Line 205 – How was bias calculated? Line 262 – What are the other models apart from a power law fit? Line 262 – 263 – Are RMSE values and r squared values here from cross-validation or from the training data? Line 263 – Just present the bias from cross-validation. Line 271 – How feasible is it to scale by wood density in the absence of inventory data? Presumably errors would be larger if modelled estimates of wood density were used. Lines 287-301 – It would be useful to also see how MCH performs at detecting this loss of biomass. Lines 376-377 – This is a very nice approach to identify how much biomass is missed by LCA. Figure S2 - Given that the minimum cluster size didn't have a major effect on the AGB estimates, I would be interested in seeing a comparison of the performance of the LCA metric just following masking versus the LCA metric following removal of segments below the threshold cluster size. How computationally costly are these last steps?

Technical comments: Inconsistent approach to using capitals in section headings. Line 209 – => Detecting changes of selective logging. Line 385 - => LCA as an AGB estimator.

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