Biogeosciences
Discussions

Interactive comment on "Tree height and tropical forest biomass estimation" *by* M. O. Hunter et al.

Anonymous Referee #2

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This research provides valuable insite into the uncertainties inherent in the height relationship with biomass and allometric estimation in terrestrial forests; including field measurement precision, field measurement accuracy, sample quality, and generalization uncertainty in allometric relations. This work maintains its focus on relevnace to field estimation and allometric models, while offering a breadth of discussion on both implications of uncertainty into estimation at scale and makes recommendations on in-field techniques.

This review identified no technical or procedural inconsistency or anything that indicated poor methodology.

The language and presentation of the work was generally good and clear, however there are instances where the language is awkward or hard to interpret. It is also recommended that terminology be re-evaluated, for instance there were instances where

the word "offset" was being used to describe differences which was confusing (this is just an example). But overal the language and presentation was good/acceptable.

Specific Comments:

Abstract:Line 27: this may not be implicitly asserted in your text, but it is literally impossible to measure anything directly from space, it is all proxy and model from radiation.

2.1 line 12: It is not immediately clear to the reader why climate information is relevant, is it just anecdotal, or will this influence thins like generalized allometric relationships that are used in this study? Please give a short note on why you are telling us this.

2.3 line 8: "returns for every shot", the term "shot", is this synonomous with pulse? Or are you indicating a set of pulses? Please clarify what a shot is.

2.3 line 13: "use to estimate offset", it is unclear what you mean by "offset". Is this measurement differences, error, ...?

2.3 line 20-23: You cover the uncertainty of the canopy top lidar estimates. However you do not really cover the uncertainty in your estimate of modeling the forest ground floor. It appears that the point density of ground hits is low, and that a TIN model is used to interpolate in between these hits. Pleaes give some indication of the ground hit point density, and your confidence in the ability to estimate the depth to ground. It was mentioned that the topography of these sites with one execption was relatively flat, if this is the argument please comment on that.

2.5 line 5-7: Is there any temporal difference in your repeat sampling in the Tapajos? If the time difference is significant you have to factor in the possibility of growth increments. If sampling was done in relatively close temporal proximity, please note that.

2.5 line 13: Regarding the random number generation. What was the distribution you selected random numbers from, the reader may assume uniform as a default, is this the correct assumption?

2.5 line 24: This sentence is pretty awkward, please make it more concise and easier for the reader to interpret. (awk will indicate other instances)

3.1 line 19: Awk, also, please be clear or definitive about what "offset" means.

3.1 line 21: I may had interpreted your explanation wrong, but it is statistically unlikely that standard deviations of sub-samples will increase, when taken from the whole population. A spread in mean values should decrease the average distance between the means and their respective sample points. This was either confusing and surprising, could you please check/explain/clarify this result?

3.2 line 27: Should this be -1.4m?

3.2 line 8: (awk)

3.4 line 13: "were compared with heights modeled via site-specific ..." or something similar

3.4 line 15: "reference values", I assume this means the field measurements, but explicitly stating this will be easier for the reader

3.5 line 6-7: The first sentence does a weak job at motivating your analysis and discussion of the sample size.

3.5 line 9: "weighted equally", this is unclear what this means. Do you mean that samples attempted to balance or have equal selections from the various size classes?

3.5 line 11: why is there a range 7-10%, is this the cross site range? Please clarify

4.1 line 3: The plot shows variability in the differences between re-sampled individuals no, the text does not specify what exactly is varying. Please be a little more concise about what exactly is varying.

4.1 line 5: "but the majority of the source", please elaborate and clarify, little awkward, what sources and what positive bias?

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4.1 line 11: offsets -> differences

4.1 line 14: this usage of "offsets" make sense, please treat this as a non-comment!

4.1 line 16: this usage of offset... this is a physical offset between the horizontal position of the crown top and the trunk base, in this context you are indicating there measurement uncertainty attributed to this offset, which is a source of error or uncertainty. My point is to just have a consistent stategy and clear delivery of these concepts.

4.1 line 29 (after break 10507, talking about Rennie 1979): "bias low" consider changing to "underestimation bias", and for subsequent usages: "overestimation bias" and "underestimation bias"

4.2 line 15: "The uncertainty in the precision", unsure what this means. Please clarify.

4.3 line 28: "applying the diameter only Chave and Chambers" (awk)

4.3 line 8: "reference case" using this terminology is not inaccurate, but it is easier for the reader to explicitly state what reference case is (field estimates).

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