Dear Dr. T. Baker,

Thank you for the relevant comments and suggestions you made on our manuscript. We here address the different points you raised in your review.

Reviewer comments (in italics): "*1. Practical recommendations: I was surprised given the effort the develop models for canopy mass based on direct measurements of canopy size, and their improved performance compared to models based only on diameter and height (m3 compared to m2 in Table 2), that the final recommendation is only to implement model m2 (ie just measure tree height to the base of the canopy). To me, making a few additional measurements of canopy diameter for the few largest trees in a stand would not be particularly onerous, would improve accuracy, and would be important for linking field measurements to any LiDAR studies. Why is this option rejected?"*

Our response (in plain text): We indeed put emphasis at the end of the manuscript on model m_2 which only requires trunk height as additional measurement, as we believe it much simpler to implement in a standard forest inventory protocol that already includes tree height measurements than would adding a full set of crown metrics, even on a subset of trees. We however agree that information on crown diameter, or even crown architecture, for the largest trees in a stand is highly valuable, notably for remote-sensing studies. But except for scientific studies, we are not convinced that collecting such data will become a common practice in the coming years. Unlike trunk height, measuring crown diameter is increasingly difficult as tree ages and forest canopy becomes crowded. In tropical forest canopy, crown limits are often difficult to identify, all the more when one needs to have his sights set on two opposite crown limits from a single vantage spot, as required by most Laser measurement devices. It follows that even if one only targets the largest trees in a stand, this operation is time-consuming and probably inaccurate or even biased if too quickly performed. It is not unlikely that the development of mobile terrestrial Lidar scanning technology will make it possible to extract crown data more easily in a near future. The option to include more detailed crown measurements into biomass allometric equations is therefore not rejected, but from a practical point of view, the collection of only additional trunk height data appeared to us as the most reasonable option for immediate large-scale application in operational contexts. We added a sentence at the end of the manuscript (section 4.3) to clarify our choice to the reader.

"2. Height definition: I agree that the definition of the canopy base needs to be carefully considered in the manuscript as it is an important parameter in the models. For example, it might be useful to set a minimum diameter for the lowest living branch to define these measurements (e.g. 5 cm). The authors of the manuscript involved in data collection would doubtless have valuable experience to define this carefully for tropical trees."

We indeed proposed to change our definition of crown base from "the height of the first living branch" to "the height of the first main branch". As pointed out by Dr. Rutishauser in his comment to the paper, the former definition would have included short-lived branch such as small unreiterated and/or epicormic branches, while the latter typically refers to long-lasting branches (e.g., forks). On large trees for which we advocate measuring trunk height (≥ 100 cm DBH), identifying the lowest main branch (elsewhere called "crown-forming branch", Husch et al., 2002) is often straightforward and routinely performed by foresters. However, as subjectivity increases with decreasing tree size, we understand the appeal of setting a branch diameter threshold (e.g. 5 cm). Besides setting a threshold for branch diameter, it might also be necessary to set a threshold for the vertical position of the branch along the main axis. For instance, while one may consider accounting for a 5 cm branch located e.g. 1 m bellow a growing fork (i.e. future crown base), the same 5 cm branch may be left out if it is rather located 2, 3 or 4 m bellow this point. The form of these thresholds (i.e. in cm or in % of tree DBH) might also be discussed. We believe that our field experience cannot backup all those choices that should rather be addressed using a statistical approach. Again, terrestrial LiDAR scanning technology appears particularly promising in this regard.

"3. Collinearity. The potential problems of collinearity in biomass models have been a contentious issue in the literature, and could be raised in the context of this study as well. Personally, I agree with previous work by a linked group of authors (Picard et al., 2015), that these problems (defined by considering variance inflation factors) are secondary to evaluating model performance against data, particularly now that the datasets are increasingly representative of the full range in structure of tropical trees. However, I think it would be useful to refer briefly to this debate and the literature on this point (e.g. in section 4.3), so these points are clear to readers."

We agree and have added a paragraph in section 4.3 to refer this issue.

"4. Scaling up: I like the comments in the discussion about how the effect of these findings will depend on the size structure of the forest (section 4.2). I think it would be useful to expand this slightly to reflect on how inclusion of canopy mass will improve our understanding of broad-scale differences in biomass among forests. For example, we know that African forests tend to have more large trees than Amazonian forests (Lewis et al., 2013), and that canopy size varies with seasonality in Amazonia (Barbier et al., 2010). What implications does this work have for detecting differences in biomass among continents and along environmental gradients?"

Thanks you for this suggestion, we expanded section 4.2 accordingly.

Equation 2: H should be Ht, I think.

Correct, it has been replaced.