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Interactive comment on "Interspecific variation in tropical tree height and crown allometries in relation to life history traits" *by* Isabel Martinez Cano et al.

Anonymous Referee #3

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Interspecific variation in tropical tree height and crown allometries in relation to life history traits

General comments

This paper uses a rather impressive dataset of nearly 10,000 observations of tree height and 2,500 observations of crown area on 162 tree species located in Barro Colorado Island, Panamá. The main results are: (i) light-demanding species attained taller heights at comparatively smaller diameters as juveniles and had shorter asymptotic heights at larger diameters as adults, and (ii) the use of saturating functional forms and

the incorporation of functional traits in tree allometric models is a promising approach to improve estimates of forest biomass and productivity. Apart from my reservations about the data collection and some mostly minor suggestions on presentation and understanding, the manuscript is very readable and the presentation is clear. However, the novelty of the present study compared to previous studies has not come across very clear to me. The first research question (How is interspecific variability in allometric scaling of tree height and crown area related to tree species functional traits, in particular wood density and measures of shade tolerance?) has been strongly studied in tropical forests, for example the study of Poorter et al. (2003, 2006) from Liberia and Bolivia, Iida et al. (2011) from Malaysia, Loubota Panzou et al. (2018) from Congo. This first research question should focus on the notion of convergence in tree allometry of coexisting tropical tree species that is not widely supported by previous studies, except for the paper Iida et al. (2011). The two last research questions have been studied in tropical forests (Fayolle et al., 2016; Ledo et al., 2016; Sullivan et al., 2018; Mensah et al., 2018). This study should focus on the effects of species or functional groups on the estimation of biomass and carbon stocks. The authors have studied the consequences of height-diameter allometry on the estimation of biomass and carbon stocks. The consequences of crown area allometry could be interesting in the estimation of biomass and carbon stocks using the allometric equation of Ploton et al. (2016).

Specific comments

Page 1

The title is a bit unclear to me, because this aims to study the interspecific variation in tree allometry and its consequences on the estimation of biomass and carbon stocks.

Lines 23-24 "Our results provide an improved basis for parameterizing tropical tree functional types in vegetation models" I found "tree functional types" to be a little unclear.

I found the lines 26-27 are unclear.

Page 2

Line 8: What do you mean by “tree dimensions”? A non-specialized audience (i.e. readers who are highly familiar with the literature on comparative tree biology/architecture) is likely to not specifically understand what the authors are talking about.

I found the paragraph (Lines 17-26) to be a little bit lacking in detail. First, I think the authors could include some examples of previous studies on the interspecific variation in tropical tree height and crown allometries. Secondly, the authors could include the information’s on the relation between tree allometry and life-history traits. Lastly, the effects of species-specific or functional groups on the estimation of biomass should be developed in this section.

Page 3

Line 8: “the vegetation is moist tropical forest”. Please specify the forest type: deciduousness forest or evergreen forest?

Line 10: “. . . with trunk diameter of 1 cm or larger . . .” What do you mean by “trunk larger”?

Line 16: I propose the “tree measurements” rather than “allometric data”.

Lines 16-25: this paragraph lacks of details on the data collection. I would like the authors’ give more information on the compilation of these seven datasets.

Page 7

Lines 5-12: the authors may add the names of species of low height or crown area and high height or crown area.

Line 14: “. . . with dependence. . .” please reworded

Page 9

Lines 16-17: “Past work suggests that mechanical resistance to self- or wind-loading cannot explain tree height allometries, as trees are generally much shorter for a given diameter than the limits based on static mechanical constraints (Niklas, 2007)”. This is disconnected from your results.

Page 10

Lines 12-13: Blanchard et al. (2016) study the variation inter-sites in tree allometry. Please see the reference Lines et al. (2012).

Page 12

Lines 30-31: This last sentence isn’t necessary.

Page 24

This Fig.4 isn’t necessary.

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