Biogeosciences
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Discussions

Interactive comment on "Identifying climatic drivers of tropical forest dynamics" *by* M. Aubry-Kientz et al.

Anonymous Referee #1

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Scientific significance This ms addresses the important question as to what climatic factors govern tropical tree growth and mortality in the tropical rainforest of French Guyana using a large dataset containing measurements on more than 20 thousand trees over a period of 20 years. This is a significant effort using one of the larger datasets available for growth and mortality of tropical rainforest trees.

Scientific quality The analysis presented makes use of various statistical techniques to assess to how tree growth and mortality are shaped by various climate factors. It includes the use of PCA to unravel correlation between climate variables, and the development of a growth and mortality model, with maximum diameter, wood density, height and d13C as explanatory variables. This seems a valid approach. Then they proceed to apply a MCMC method (Markov chain, mote carlo) for estimating the climate

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Interactive Discussion

Discussion Paper

influence on growth and mortality.

Presentation quality While the efforts of the authors to elucidate the growth and mortality dependence on climate variation can be applauded, the description of the methods, results and the following discussion can be much improved.

While I think the performed statistics are sound, the authors need to explain better step by step what they did and why. The statistical methods, especially the MCMC-method should be explained more clearly and authors need to justify their choice of use of this particular set of statistical methods versus other methods, like multiple regression techniques. Why using univariate approach?

The authors do not explain very well what the relative influence of the various climate variables is. They say what climate variables are associate with what, but how can the reader infer form the table 3 the relative influence. Thus, is it possible to give more information on what the values in the table 3 mean. How much of the variation in growth do they explain, and how can the reader see what variables most strongly influence growth.

Can the authors explain why they use this particular model definition? There seems to be no explanation or justification as to why this particular form of the model. Also the justification for the inclusion of the different functional traitscan be more detailed.

How sensitive are the results for different model choices and for different algorithm set-ups? This might be crucial but I see no discussion on this. Please provide the readers with some insights on this.

What is the use of the table 4? It is not clearly embedded in the overall results, and reference to the table comes after table 5. The sentence at the start of section 3.3 is unclear. Interaction between WD max –WD and drought is negative (table 4) . . . is this an outcome of this study or of the literature? This part needs to be explained much more clearly. Currently it reads as if the table merely presents the findings of others,

but the results are from this study I infer? Please explain this better in the results and give a proper discussion on the findings. Also mention the studies in the introduction and explain why they hypothesize this.

Conclusions can generally be more clearly written and put better into context. The importance of the results and findings should be emphasized much more clearly. In the current format I find it all a bit too concise.

In the conclusion, three subsequent statements are made that require some references and justification. Please explain which studies say that dry seasons are becoming longer and stronger, which study says that precipitation is expected to decrease (some studies show increasing precipitation over the Amazon) and by how much is temperature expected to increase! Model predictions for climate in the Amazon vary widely.

Specific comments. -The English phrasing can be improved throughout. Sometimes it is simply too concise to be sufficiently clear. -Page 3155, line 24. Diameter at maximum growth is attained for 0.794DHBmax." Please rephrase. -Nd under and Nunder are both used. Please check consistency. Also in general the ms would profit from less use of acronyms. -Page 3149 line 17 word "height" is missing. Page 3146 line 21. What is meant here with demonstrable success.? -Page 3147 line 7 A consensus . . .. What is the consensus? Please be specific on what you want to say. -A climate graph on the climate in French Guyana would be beneficial.

Interactive comment on Biogeosciences Discuss., 12, 3145, 2015.