

Biogeosciences Discuss., referee comment RC1
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Comment on bg-2021-102

Ricardo Dal Agnol da Silva (Referee)

Referee comment on "Strong temporal variation in treefall and branchfall rates in a tropical forest is related to extreme rainfall: results from 5 years of monthly drone data for a 50 ha plot" by Raquel Fernandes Araujo et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-102-RC1>, 2021

General comments:

The study explores a rich and unique dataset of 5-year monthly drone imagery collected in a tropical forest (BCI) to investigate mortality associated with treefalls and branchfalls. This is a very important and novel study because it is very difficult to have such data available that allows studying intra-annual variability in mortality and connecting to climate drivers such as rainfall and wind, and help understand why and when trees are falling and dying. The paper advances on this understanding going further than previous work which analyzed around 1-year of drone data. The paper is well-written and clear to read - I enjoyed reading it, figures are well presented and clearly show the results and main messages. Overall, I believe this was an excellent study and I only have a few comments to offer.

Specific comments:

1) For the relationship between canopy disturbances and rainfall, I am worried if it makes sense to mention the 99.4th percentile in the Abstract because it may sound like cherry picking, like why '99.4' and not '99.3'? The correlation seems to change a lot in between 98-99 percentiles which may be a sign that the correlation may be spurious and not causal (Figure 5b). Moreover, if you look to Figure 5a and remove for example the most frequent rainfall event, the relationship would likely fall apart. How is the correlation for lower than 90 percentile? If the correlation would be causal I think it would be expected much weaker or no correlation at lower rainfall percentiles

2) I suggest authors consider adding a last paragraph of Discussion offering some advice for future studies, e.g. do you have recommendations for other researchers interested in replicating the experiments in other tropical forests, in regards to drone acquisition (camera, altitude, etc.), temporal frequency, etc. How would the replication of this study in other tropical forests help us understand the mechanisms better? This is a question to reflect and perhaps add something about these implications in this last paragraph. Some of these info is already scattered throughout the text but it could be important to have a concise paragraph on this.

3) In the Results/Discussion you say that you did not analyze the standing dead trees because you may miss those in your analysis. In the Abstract you suggest future studies of it. Perhaps in Discussion you could add some suggestion to better deal/analyze standing dead trees in future works.

4) L331-332, but did you find the effect of gap contagiousness ? I was thinking about this when looking to the disturbances map, where lots of gaps were occurring nearby each other. Your data should allow you to test this hypothesis and likely is one of the best datasets around to do it.

Technical corrections:

L30, Strong -> robust?

L124, why put this in between parenthesis? it is useful information, should remove parenthesis

L170, remove parenthesis – similar as before

L172, what do you mean by “graphed”?

L177, remove parenthesis – similar as before

L182, remove parenthesis – similar as before

L235, Figure 5, It is a bit strange to show Pearson's correlation r besides a linear regression, it may misguide for R^2

L352, this information about the criteria should be in methods