Anonymous Referee #1

I appreciate the work done by the authors to address comments from myself and the other reviewers.

Re: Thanks!

Anonymous Referee #3

The authors have done a great job in addressing the comprehensive comments. The revised manuscript has improved readability and clarity. Overall, I think the study is providing useful information to model Palms and hurricane effects on vegetation dynamics.

A few further comments:

Comment #1: Fig. 3. Please clarify what does 'seedling density mean'? Does your model prescribe seedling density as a function of time or these are actually new recruitment due to internal/external seeds.

Re: The "seedling density" here means seedling density from seed rain, which are new recruitment due to external seeds that is a function of time since the last disturbance (Eq. (2)). We have revised the manuscript for clarity. Line 231.

> "**Figure 3.** The seedling density **from seed rain** for each PFT **as a function of time since disturbance**."

Comment #2: Fig. 6. For the GLUE results, what are the covariances between posterior parameters? I was wondering about the equifinality issue in such kind of inverse estimations, which might partly explain/interpret the high importance of light-related parameters?

Re: The figure below shows the correlation coefficients between any two posterior parameters. Instead of showing the covariances, we are showing the correlation coefficients, because the differences in variances among parameters are very large. For example, the variance is 19.64 $(\mu molCO2\ m^{-2}s^{-1})^2$ for Early PFT Vm0 (carboxylation rate), but less than 0.0001 (unitless) for Rgf (growth respiration factor). Correlation coefficients are covariances normalized by the variances of the two variables involved and thus are more comparable among parameters. The figure shows that the posterior parameters are correlated (covariate) with each other, which is expected. Since this figure does not add more essential information to the manuscript, we will not include this figure in the revised manuscript.

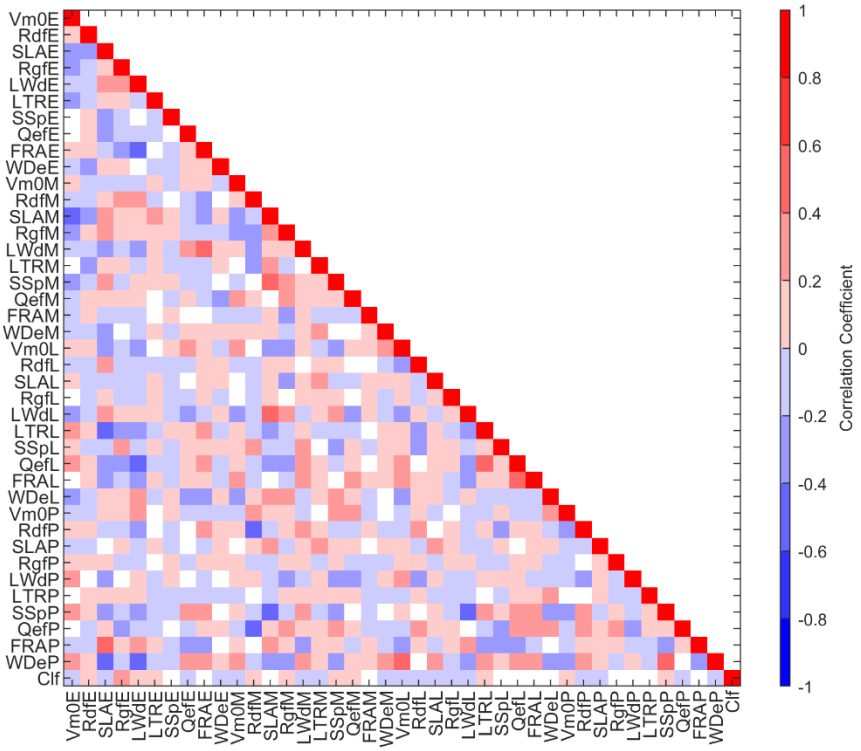

Figure R1: The correlation coefficients between any two posterior parameters. The coefficients are calculated as the weighted correlation coefficients and the weights are those of each realization (calculated from Eq. (4)). The correlation coefficients that are significant at 99% level according to two-tailed *t*-test are shown with red (positive) and blue (negative).

We had discussed equifinality issue in Section 4.2, "*Given the nature of equifinality, there may be multiple parameter sets that can lead to the same observed state (Beven and Freer 2001), and thus the optimal parameter set we found from GLUE may be one of many possible solutions*."

The light-related parameters are of high importance are largely because of the light limitation for plants in the model. Nutrients are assumed unlimited in the model, water is not limited in this tropical site, and light limitation matters the most, and thus light-related parameters contribute largely to model uncertainties. This is consistent with Meunier et al. (2021) and we have added a few sentences in the revised manuscript. Lines 608-612.

> "The optimization is sensitive to light-related parameters, such as clumping factor, quantum efficiency, and dark respiration (Figure 9). **This is possibly because light limitation is the most important limitation in the model, as water is not limited in this tropical site, and we turned off nutrient limitation.** This is consistent with Meunier et al. (2021) who found that light limitation contributes partly to model uncertainties."

Comment #3: Around Line 640 (ms with tracks) "Compared to other optimizers (such as PEcAn) that calibrates parameters using plant traits observations (e.g., wood density, leaf turnover rate), GLUE's ability of utilizing observations of forest stand variables (BA, AGB, etc.) could further reduce the uncertainty of parameters (Wang et al. 2013)" --> I am a little confused here. Doesn't PEcAn also have the ability to use BA/AGB to constrain the model in addition to plant traits observations? (e.g. Feng et al. 2018). Is this a true advantage of GLUE?.

Re: PEcAn was developed to "*synthesize plant trait data to estimate model parameters, propagate parameter uncertainties through to model output, and evaluate the contribution of each parameter to model uncertainty*" (LeBauer et al. 2013). The field measurements used in the PEcAn framework are those that are parameterized in the model (such as respiration rate, specific leave area, etc.) and parameter optimization/calibration is conducted before running model simulations. For BA and AGB, they are not parameters but model outputs, and thus they cannot be used for constraining model parameters in the PEcAn framework. In Feng et al. (2018), AGB was not used to constrain the model (or calibrate the parameters) but used to validate model simulations. We have revised the manuscript for clarity. Lines 600-603.

> "Compared to other optimizers (such as PEcAn) that calibrates parameters using plant traits observations (e.g., wood density, leaf turnover rate) **before running model simulations**, GLUE's ability of **constraining parameters from model output variables** utilizing observations of forest stand variables (BA, AGB, etc.) could further reduce the uncertainty of parameters (Wang et al. 2013)."

References

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