

## ***Interactive comment on “Evaluation of MEGAN-CLM parameter sensitivity to predictions of isoprene emissions from an Amazonian rainforest” by J. A. Holm et al.***

**J. A. Holm et al.**

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Response to Referee #3 – In review of MS acp-2014-684

We would like to sincerely thank the referee for taking the time and effort in reviewing our manuscript. The referee made notable comments, most of which require slight changes in the manuscript. A main focus was spent on correcting grammatical issues and improving the organization of the manuscript. We have incorporated these modifications and hope that the changes we are suggesting are sufficient. The changes listed below have been incorporated into a final version of the manuscript, which we

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hope will be reviewed and accepted for publication.

Foremost, we agree with the comments by the anonymous referee #3.

We agree that the manuscript could improve in its organization and when describing supporting literature. We have therefore improved the description of the supporting material.

Page 23997, line 5; ‘chemical compounds’ here refers to VOCs, and has been updated in the manuscript. Page 23997, line 16; has been updated to “BVOCs”. Page 23997, line 22; has been updated to “is”. Page 23997, line 23-25; This sentence has been clarified.

Page 23998, line 9-10; This sentence has been clarified, and a reference has been included to confirm this statement. While there could be multiple factors at play, there has been evidence that increased diffuse light can decrease temperature (as a result of decreased direct light).

Page 23998, line 19-21; this sentence has been edited and clarified.

Page 23998, line 28; This sentence has been re-written to be less confusing. We were using verbiage from the 1997 reference, but have re-written it to be more straightforward.

Page 23999, line 26-28; This sentence has been clarified.

Page 2400, line 12; The reviewer is correct in that ‘uncertainties of observational’ has not been mentioned yet in the paper. This was an artifact from an earlier version that did list uncertainties in observational emission rates, but has since been removed. Line 12 has now been updated.

Page 24000, line 29; has been updated to ‘contribute’ Page 24001, line 15; has been updated to ‘based on’ Page 24001, line 19-20; updated units to be ‘Tg C yr<sup>-1</sup>’ and ‘Tg yr<sup>-1</sup>’ Page 24001, line 24; updated to be ‘account’ Page 24002, line 6; updated to

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be 'known' Page 24002, line 9; updated to be 'emission activity factor' and has been corrected throughout the paper.

Page 24002, line 11; updated to be 'photosynthetically active radiation' Page 24003, line 21; updated to be 'Table 2' Page 24004, line 11-12; added a description to make the distinction between CLM-CN and CLM-BGC

Page 24004, line 13-15; we choose not to use the average modeled isoprene values over the whole Amazon region, because one CLM gridcell is already an average of a landscape (100km x 100km), and each of the observational data values are from single sites in Brazil. We felt like using average Amazon Basin values would not be comparable to the observational dataset. In addition, we wanted to pick a CLM location that was close to the measured leaf temperatures used in this study, and where on-going BVOC measurements are taking place.

Page 24005, line 9-11; this sentence has been re-worded so that it is not confusing. The flux measurements are referring to measurements that were used to create the PFT emission factors that are used in MEGAN2.1.

Page 24005, line 14; kept as 'Table 2' Page 24005, line 24; updated to 'leaves'

Page 24007, line 27-15; this is a good suggestion by the reviewer. Table 1 has been updated to include measurement methods so that the text in the Methods section can be decreased and more straightforward.

Results:

- Addressing the issue of why both MEGAN-CLM 4.0 and MEGAN-CLM 4.5 are used. CLM 4.5 is a fairly new release of CLM that has not been tested and evaluated to its fullest extent. We wanted to show the changes and improvements as a result of updating CLM from 4.0 to 4.5 so that users are aware of the differences. In addition a large part of the community still used CLM 4.0 and we thought it was noteworthy to highlight tropical isoprene results from this version.

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- 3.2 Linear regression analysis: The data used for the linear regression analysis is from model results from MEGAN-CLM 4.0 (which were also very similar to 4.5). This distinction has been updated in the figure caption for Figure 2. We evaluated the correlation of the biophysical parameters and gamma (emission activity factor).

Page 24008, line 23; the definitions and time periods of wet and dry season have been defined.

Page 24009, line 26-27; this sentence has been clarified. We added in that there is large variability in observational measurements, so therefore multiple estimates will help to reflect that variability.

Page 24013, line 17-20; this sentence has been clarified.

Page 24014, line 26-3; we agree that this paragraph in the results section could be improved and we have re-written it so that it is clearer.

Discussion –

- We agree with the review that parts of the discussion read more like an introduction. The other reviewers have brought this up. We have condensed our discussion section and removed a major portion of the literature review in the discussion and the supporting model experiments/results. We have now included these supporting papers and results in a table, which we believe improves the discussion section.

- Comment about model names: we have either defined all of the acronyms and model names, removed them and only included the references, or have moved them to the new Table we referred to above.

Page 24018, line 17; to stay consistent with the whole paper, we have replace PPF with PAR.

- Per the reviewers comments we have changed the 'Summary and concluding remarks' to just 'Summary'. We also agree that when CLM is referenced, we should

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indicate which version of CLM is used. This has been updated in the text.

We appreciate the thoughtful comments and reviews by the referee, and think the paper is stronger as a result.

Thank you for your consideration, J. A. Holm

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 23995, 2014.