Biogeosciences Discussions

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Comment on bg-2022-142

Anonymous Referee #1

Referee comment on "Growth and actual leaf temperature modulate CO_2 responsiveness of monoterpene emissions from holm oak in opposite ways" by Michael Staudt et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2022-142-RC1, 2022

Growth and actual leaf temperature modulate CO2 -responsiveness of monoterpene emissions from Holm oak in opposite ways

Staudt et al.

General Comment:

The authors did a very thorough investigation on a specific scientific question that certainly is of relevance for the evaluation of climate change impacts on biogenic emissions and feedbacks on air chemistry. In my opinion the experiment has been well set up and carried out. The interpretation is supported by a number of ancillary measurements so that some interesting ideas about the potential underlying mechanisms could be developed. Also, the authors revealed a well-founded knowledge about the topic and the relevant literature.

On the downside, I noticed that wording and style could be improved. Many sentences are inconveniently complicated or long and selected expression are often unfamiliar or imprecise. I would recommend to check, shorten, and involve an English native to improve the text. Also some shifts between results and discussion sections and a better description of the equations used for sensitivity analysis should be considered at the appropriate places.

Specific Comments:

Abstract

It seems unclear to me, what the cool and warm growth regimes look like. Indicating only the 5-degree difference is not sufficient. Compared with the quite extensively discussed results and conclusion, the description of the outcome is relatively meager.

Introduction

L65: I assume that MTs are not synthetized but only stored in resin ducts.

L76: superfluous ‘very’ (remove)

L85: superfluous ‘before’ (remove)

Description

There is a bit of a mix between description and discussion, check (e.g. L200-203)

Could you please indicate the equation used for emission factor reduction in MEGAN here (and not in the results as a caption text)?

Define G400, A400

Results

Figure 1: It is a bit irritating that the emission factor (per unit m2) should increase with the number of leaves. I see that the latter is meant as a growth indicator, which should, however, be better illustrated (e.g. final number of leaves? Number of leaves in the end of the growth period?)

Figure 2: Better use the same design for Ci in each of the graphs (i.e. that which shows relative NPQ)

Figure 3: You probably mean key relations instead of key correlations. Actually, I have difficulties to see understand both, the explanations of how this is calculated and the reason why it has been done.

L364-366: The difference between the explanations for the two different responses to temperature are unclear. Rephrase and consider to elaborate the arguments.

L371ff: Should this really be one figure caption? Generally, I expect a short, clear and consistent description of what I see. This is violated at least since line 376. Instead, take care that the abbreviations are all clear (e.g. chloro, growth?). It could also be considered to use this figure as a basis for discussion and put into chapter 4, possibly in several stages in order to better support the reasoning in the different chapter.

Discussion

What I am missing is a discussion in how far the results can be assumed general findings or are specific for Quercus ilex? Is it likely that conifers, evergreens, broadleaves or Mediterranean plants react similar? Do you think the BVOC emission groups should then be differentiated by their degree of genetic relatedness or to site conditions typical for the species?

L513ff: With the summary here, the paragraph tends to be lengthy and repetitive. I would

suggest to take the essence from this paragraph to the conclusions (and delete it here).

L550ff: Here, for the first time if I am not mistaken, the authors declare that they also run some simulations to test the sensitivity of the found mechanisms. While I am not against such exercises, this comes as a surprise and should have been mentioned and described before (and shorten it here). Also Fig. 6 is a result and only part of its description belongs into discussions.

Conclusion

L599: concentrations instead of variations; "hardly effect emissions" or "affect emissions only marginally" or similar instead of "affect little emissions". (good example for wrong wording)

L615ff: Missing knowledge as well as stating additional references is not something, that should be put into a conclusion. Please consider to shift it towards the discussion.