

Interactive comment on “Leaf level emissions of volatile organic compounds (VOC) from some Amazonian and Mediterranean plants” by A. Bracho-Nunez et al.

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Received and published: 28 January 2013

Reply to Anonymous Referee #3

Main comments:

Referee: The manuscript aims to present a screening of BVOC emission rates of Amazonian and Mediterranean species. In its current form, the manuscript does not qualify for publication. It is not a clear structured screening or a report on ecosystem specific differences. It does include also some ecological viewpoints like the different habitats of Amazonian species (floodplain and upland) but the discussion about the differences in emissions is weak and almost drowned in lengthily described, already known findings.

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The potentially new information does not really come to play here.

Authors: We summarized our screening data measuring a set of typical Amazonian tree species and compared them with the very heterogeneous emission spectra as known but as demonstrated here again for Mediterranean plants. We are aware that the some parts of the ms are lengthy and that the originality and the novel findings of our work were not enough stressed in the first version. We fully agree that revisions are needed to qualify for publication as also requested by referee 2 and we are grateful to both referees for their helpful comments.

Of course we cannot review all ecological viewpoints of floodplains und terra firme as this would make the paper too lengthy. More detailed information can be found in the relevant publications cited in our manuscript. Too many details around differences of emissions are discussed and we agree that they can be shortened (see also comment to referee 2). However, we feel that the general comment that “already known findings” are discussed is somewhat misleading. In our view there are not too much emission data from Amazonian trees! Furthermore data on sesquiterpene emissions and on emission of BVOCs other than isoprene and monoterpenes are still scarce.

Referee: The authors state, as example, in the methodology part that they have recorded the whole gas exchange but, no information on photosynthetic status during the emission measurements is presented. This narrows the value of the reported emission rates severely. There are no information about the leaf temperatures while emission, light regimes etc. etc.

Authors: See also Comments to referee 2. We are delighted that the gas exchange measurements find so much interest. Quite often, such measurements are not performed as an accompanying diagnosis tool. We always perform such measurements to be aware of the physiological “status” of the investigated enclosed branch. As already answered to referee 2, we will compile data on gas exchange. Leaf temperatures and light conditions are given for Mediterranean plants on page 15287 lines 8-10. We apol-

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ogize in case of tropical vegetation. We will give the corresponding data in the revised version of the paper.

Referee: The measurement systems were lengthily described but the implications that Amazonian species were measured in large (9L and 100L) cuvettes, representing branch or whole plant emissions but the Mediterranean species measured with a leaf cuvette (105 mL) is nowhere discussed. Especially it is a question what is the number of replicates? Trees, branches or leaves.

Authors: The number of replicates is clearly described as replicate of tree species on page 15284 for both ecotypes. Concerning the enclosure systems, we did not intend to compare enclosures. Instead we relied on the experience made in recent experiments over the last 20 years. A discussion upon different enclosures can be found in the paper of Niinemets et al (2011). The general outcome of that review was that enclosures with low air exchange rates can favor stress conditions than in turn can affect the emission rates. In our study, both systems were fully or partly environmentally controlled (humidity, light, temperature) and run with sufficient air flows to avoid stress and potential artifacts.

Niinemets, Ü., Kuhn, U., Harley, P.C., Staudt, M., Arneth, A., Cescatti, A., Ciccioli, P., Copolovici, L., Geron, C., Guenther, A., Kesselmeier, J., Lerdau, M.T., Monson, R.K., and Peñuelas, J. (2011) Estimations of isoprenoid emission capacity from enclosure studies: measurements, data processing, quality and standardized measurement protocols. *Biogeosciences*, 8, 2209-2246.

Referee: The readability and therefore the information one can gain by that manuscript is largely hampered by the bulky sentences. As example, long lists of species names, or lists of percentages. These things should be presented in tables.

Authors: We will rewrite and restructure. See also comments to referee 2.

Specific comments

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Referee: Enclosure techniques: If I got the point, you have used the "elsewhere" described system for tropical plant measurements and the detailed described part refers to the mediterranean measurements? Please change that paragraph so that this come clear. In the current form, the long and detailed described system appears out of the blue and it is not obvious if it refers to the one or the other measurement system.

Authors: There is some misunderstanding. See answers to referee comments below, concerning page 15286.

Referee: Page 15286, line 6ff: How was the temperature within the chamber? You have an enclosure where it is, say, easy to cook the plant. So temperatures can rise high in such enclosures if there was direct light on it.

Authors: Please see our comment above. Temperatures were measured within the cuvette for all tropical experiments (as described) to detect any increase. As we did not find substantial increases we did not present exact data; that was a mistake, we agree. But these data will be given in the revised paper. However, for the Mediterranean experiments it is clearly reported that leaf temperatures were kept constant at 30 °C (page 15287 lines 8-10).

Referee: Page 15286, line 26ff: Ok, here it come clear that the above, elsewhere described system was actually described in this work once more. Is that necessary? Here you also describe detailed, but with less effort the system used for Mediterranean plant measurements. Is that necessary? Maybe that system was also described before and can be linked by reference?

Authors: We do not well understand this comment. We tried to briefly describe the enclosure techniques within the corresponding chapters taking into account that these techniques are sufficiently described in recent papers, where the interested reader can find more detailed information. But nevertheless, at this chapter we describe the technique with a little bit information which may be helpful for the reader.

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Referee: Page 15290, line 11: You tell that you used the leaf dry weight to relate the mass flow (eq 1). Well, how was the leaf dry weight obtained? The Amazonian trees have been either complete saplings or branches while the Mediterranean refer to one leaf (small cuvette). Do the tropic species exude resins or contain as well oils? Are you sure that the leaves have been the only emitting tissue or compartment?

Authors: For leaf dry weight determination please read line 4-6 on page 15288. We did not find any hint to assume that the tropic plants contained resin ducts or other essential oil containing compartments.

Referee: Page 15292, line 11ff: Please do not just repeat here the information (percents) that are already given in the figures.

Authors: We will restructure the manuscript. Please see comments to referee 2.

Technical comments

Referee: Generally I would turn around the axes of figures 1 and 2. The species name as y-axis and the emission rates as x-axis. It is much easier to read then the species name and if common emitted compounds would be presented on the same scale a visual comparison between Mediterranean and Amazonian species might be possible.

Authors: We do not agree, but would like to point out that we plan to restructure implementing tables instead of figures (see referee 2).

Referee: Table 1: The footnotes reusing the letters a through f and the ecosystem codes (a through j) render the readability of that table to almost zero. As reader, I will just skip finding what is what and the information in that table will be almost useless.

Authors: We agree and check for an alternative presentation.

Referee: Figure 5: Please indicate the color codes.

Authors: We apologize and thank the referee! This information was included within the submitted figure (not in the captions!) but obviously got lost in course of the production

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process. Nobody noticed it so far and it is our fault that we did not detect this error in the BGD proofs. As we plan to skip figures in favor of tables, a complete figure in this discussion contributions might be of help and is attached.

Interactive comment on Biogeosciences Discuss., 9, 15279, 2012.

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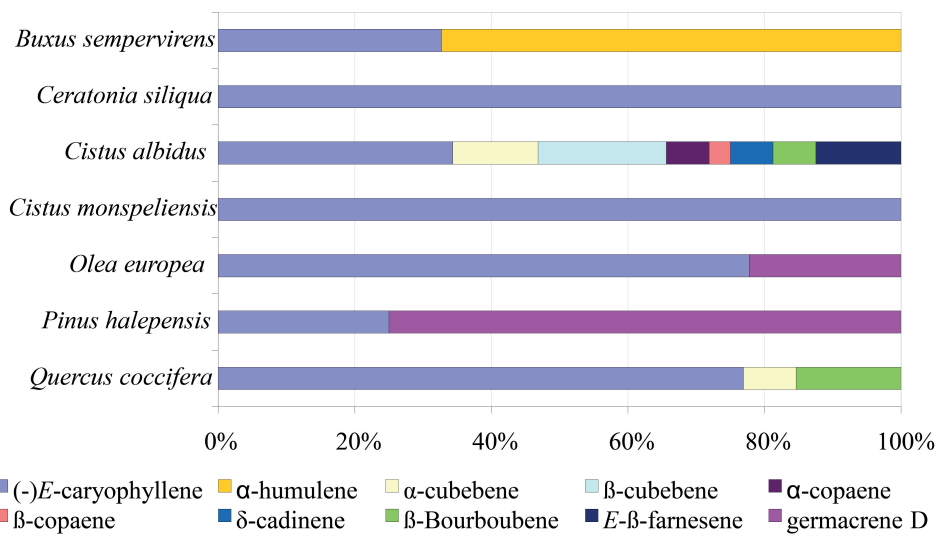


Fig. 1. Figure 5 completed. Relative composition (%) of sesquiterpenes emitted from Mediterranean plant species.