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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Variability of BVOC emissions from a Mediterranean mixed forest in southern France with a focus on Quercus pubescens" *by* A.-C. Genard-Zielinski et al.

Anonymous Referee #2

Received and published: 30 July 2014

~~General comments~~

This article describes the branch-level measurements of BVOC (mainly isoprene) emissions from Quercus pubescens trees. The data seems interesting and is a good complement of other papers resulting from the same campaign (e.g. canopy-level fluxes), so it is relevant for the scope of the journal. However the presentation and discussion of the results should be made clearer to the reader before this manuscript is ready for publication. Also, the use of CL and CT requires some further discussion and clarification. In addition, which data was obtained with PTRMS and which with adsorption cartridges should be clearly indicated in the text and the Figures to avoid confusion.

See the especific comments below for more detail. I will complement what referee #1 already commented.

∼∼Specific comments∼∼

P17227L27: delete the "-" sign after "14 ± 7".

P17227L28: should the "high" range of emissions should have the ">" simbol in front of the number "70"?

P17232L10: between the words " biomass" and " LMA", isn't there some punctuation mark missing?

P17232L23: please define IMBE and LSCE. I guess these are different laboratories where the samples were analyzed. Is there any reason for the samples to be analyzed in different labs? If so, please clarify.

P17232L26: change "closed" for an appropriate word. Maybe "close"?

P17233L18: change "chromatography" for "chromatograph".

P17234L4: Do the sunlit branches and the shaded branches have a different limit of detection? Please describe the difference in methods (sampling flow, time, etc) that justify the difference. Also specify the detection limit for shaded branches.

P17236: section 3.2 is hard to follow. Maybe you could do subsection for each VOC or VOC group to clarify...

P17237L1-2: Acetaldehyde and methanol are correlated to isoprene or to each other? Please clarify the text.

P17237L16: in the morning the authors state that the fraction was greater than in the afternoon, but the percentage for the morning is 33% and for the afternoon is 66%. Please correct.

P17239L1-8: Isoprene emission has been suggested to not be constrained by stomatal

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closure because of its high vapor pressure (Niinemets and Reichstein, 2003).

P17239L7: by "twice weaker" you mean "half"? Similar expressions are found throughout the manuscript.

P17239L8: This implies that all treated and control trees will be pooled and analyzed together without regard to their control/drought status, right? Please clarify this in the text.

P17239: section 3.3.2 is somewhat difficult to follow and may be helped by a Figure showing the differences between sunlit and shaded branches, etc instead or in support of Table 3.

P17240L14-16: these lines should be situated right after the sentence that ends in line 10.

P17240L24 and onward: In my opinion, sections 3.3.3 and 3.4 should be in some way pooled together with section 3.5 into a new section, because all the data analysis described in these sections uses an emission algorithm for interpretation (Is, CL, and CT, in this case). So not only the current section 3.5 title should include an explicit reference to emission algorithms.

P17242L12: Please clarify the last sentence.

P17243: In agreement with Referee #1, the conclusions drawn from CL and CT parameters must be revised. For example, CL -with the parameterization used in the manuscript- practically saturates at PAR>1000 umol m-2 s-1. As shown in Fig. 4, PAR is above this threshold during most part of the day (Temperature is missing in Fig4 and this hinders a better judgment of the relative role of PAR and T). Did the authors check with their own data if isoprene ER saturated at PAR>1000 or instead isoprene ER continued to increase with increasing PAR?

P17244 section 3.5: Can the authors calculate which Is factor provides agreement between the G93 and MEGAN algorithms and their measured isoprene ER?

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P17245L9-12: With the G93 and MEGAN models the diurnal cycle of emission is more or less captured, that is why the correlations obtained between measured and modeled values are so high. But the slope of those correlation is far from unity (e.g. <0.45, Figure 6) because the magnitudes of the emissions are really different as stated in the text. Please discuss further this fact when interpreting your data.

P17245L14-28: Do the authors have a measurement of the soil water content at deeper levels of the soil? Maybe just taking into account the first 10 cm is not valid for use with the current soil moisture component of MEGAN -used in this part of the analysis- which was designed basically to shut down emissions of isoprene when plants were under an exceptional drought stress. The information in the manuscript did not give me the impression that the plants were hydrically in such a bad shape, were they? This could be one reason for the poor results of the application of this mechanism to model the emissions from the oak branches in this study.

P172247L11: Change "contract" by "contrast"

P172247L13-14: When the authors refer to PAR and Temperature remaining stable, are they referring instead to CL and CT? Please redo the discussion and interpretation about the relative role of PAR and T on the emissions of isoprene, as indicated previously in this review.

P172247L20-22: Information about soil which water content depth (-0.1m) used for calculations belongs to the discussion section (i.e. P17245L14-28) and not in the conclusions.

Figure 3: Temperature and PAR should be included in the figure.

Figure 4: CL and CT should be shown, as well as Temperature, to allow the reader to interpret the data. If I understood correctly, Fig4 shows data obtained with a PTRMS. Can the authors prepare similar Figures showing data for other branches (measured with adsorption cartridges)?

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Figure 6: Temperature and PAR should be included in the figure.

∼∼References∼∼

Niinemets, Ü. and Reichstein, M. (2003). Controls on the emission of plant volatiles through stomata: Differential sensitivity of emission rates to stomatal closure explained. Journal of Geophysical Research 108: doi: 10.1029/2002JD002620

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 17225, 2014.