

Interactive comment on “Emissions of terpenoids, benzenoids, and other biogenic gas-phase organic compounds from agricultural crops and their potential implications for air quality” by D. R. Gentner et al.

Anonymous Referee #2

Received and published: 25 December 2013

General comments:

This work combines a large variety of measurements (greenhouse measurements as well as several field campaigns) with modeling efforts to give an important contribution to understand the impact of agricultural crops on the local air quality using a case study of an orange orchard which is the seventh most prominent crop in the studied San Joaquin Valley. The large amount of data presented led in some parts to some missing details. I recommend the manuscript for publication after some minor revisions.

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Specific comments:

Abstract:

P28345L9 talking about agricultural vs. anthropogenic emissions is a bit misleading as agricultural emissions should also be considered anthropogenic. Please consider rephrasing such as e.g. ‘other anthropogenic emissions’.

P28345L15-18 At this point it is not clear if this results (net effect of ozone) is from a measurement or from a model. Please clarify.

Introduction:

P28346 When talking about VOCs you only mention emissions but later on you also talk about oxidation products. It might be worth mentioning in the introduction that some of these VOCs are not directly emitted but oxidation products.

P28347 P19-26 You don't mention your modeling effort in this short summary which seems to be a big part on the whole paper. Please mention it here so the reader knows it is an important contribution to the paper.

Materials and methods:

P28348L16-18 Even though you cite Fares et al 2011 for experimental details for an extensive collection of emission factors from different tree types I think this is too little experimental information. Mention for example sample sizes of each tree species to give the emission values presented later on more significance.

P28348L26 It would be worth mentioning here what exact result you refer to, based on which you chose the orange orchard over another crop as measurement site.

P28350L18-20 You mention in line 12 above that not all the compounds are clearly emitted only by one pathway. But then based on r^2 all compounds are put into either one or the other category, right? Why is this method justified?

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P28350L28-29 Please explain how the ozone formation potential is derived. And explain SAPRC acronym.

Results and discussion:

P28351L14 Please clarify if this results are from enclosure measurements using flowering or non-flowering plants.

P28352L2 and table 2: Why is the sample size (N) for each crop type so variable (2-200)? And why is the sample size different for the different VOC classes (monoterpenes, sesquiterpenes and oxygenated monoterpenes). Is each sample not analyzed for all VOC's?

P28353L7 Where emission peaks observed during harvesting during the 2010 summer campaign in the orange orchard?

P28355L19 Where emission factors from flowering for other crops then citrus measured in the greenhouse?

P28357L5 Please give a citation for the 'well known' plant wounding compound

P28357L28 Please give a reference that shows the suitability for sesquiterpene measurements

P28358L20 and table 3: It is not clear to me at this point if the VOC's not observed during summer time are due to instrument difficulties or due to the fact that they were not present. Text and table suggest different implications. Please clarify.

P28360L12-17 This method could use a little bit more description or a citation

P28360L21 This comparison would be nice to be shown in the supplement

P28363L18 Did you observe a change in ozone or SOA measurements during the times of spring flowering, pruning, harvesting and fertilizer application. If so please mention here.

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Tables and Figures:

Table 2: see Results and discussion

Table 4: Where are reaction rate constants with OH taken from?

Figure 6: At some point in the text or the figure caption the compounds summed for anthropogenic and biogenic should be listed.

Technical corrections:

P28347L17 You spell out the meaning for the acronym MEGAN but not for BEIGIS, why?

P28348P21 Please introduce the GC/MS acronym here as it is used later in the text.

Table S7: Please check the unit for PAR.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 28343, 2013.

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