

**Review of manuscript bg-2012-19  
For Biogeosciences  
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Title: Contribution of flowering trees to urban atmospheric biogenic volatile organic compound emissions  
Author(s): R. Baghi et al.  
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Special Issue: Integrated Land Ecosystem-Atmosphere Processes Study (iLEAPS) (ACP/BG Inter-Journal SI)

***General comments***

Overall this is an interesting and important paper. Its content lies within the scope of Biogeosciences, it presents novel data, reaching solid conclusions. Once my comments are addressed, I believe that the scientific methods and assumptions are valid and clearly described. The results are just about sufficient to support the interpretations and conclusions, although measurements on the small-flowered tree species would have provided a better dataset. Once my comments are addressed, the description of experiments and calculations are sufficiently complete and precise to allow their reproduction by fellow scientists. Proper credit is given to related work and the new contribution is clear. The title reflects the content of the paper, and the abstract is clear, concise and complete. The presentation well structured and clear, and the language is precise and fluent. Mathematical formulae, symbols, abbreviations, and units are correctly defined and used. There are rather a lot of figures. I have no strong feelings about this, but if the editor requires fewer figures, then figures 3 and 8 could be combined; 4 and 6 could be combined; 5, 7 and 9 could be combined. However, the text might need to be re-arranged if these changes were made. The number and quality of references is appropriate and the amount and quality of supplementary material is appropriate.

I recommend this article for publication after the issues that I have highlighted have been addressed satisfactorily. There are a few places where clarification of meaning is needed, and they are indicated in "Specific comments".

For results presented as "averages", it would be good to also present SD or SE, otherwise, median and range.

Ideally, some sensitivity studies would help give an estimate of uncertainties.

***Specific comments***

**Abstract**

What exactly do you mean by "vegetative state"? Leaves on branches before flowering has occurred (if there are leaves at that time)? "Leaves only" during flower bud formation? Leaves on branches after flowering has occurred? etc....? This is defined in the text, but a little more information would be useful in the abstract.

"The total normalized BVOC emission rate from crabapple" – Does this mean branches of crabapple with leaves and flowers? Or flowers only?

“ The floral BVOC emitted during this three-month simulation constitute eleven percent of the cumulative monoterpene flux for the Boulder urban area” - What does “cumulative monoterpene flux” mean?

### **Introduction**

Page 3147, line 14: I question the use of the words “generic vegetation class” here, given that “generic” and “class” have very specific meanings in classification of living things. I suggest “this general vegetation group”.

### **Experimental-site description**

Page 3148, line 14: Sampling was done at a nursery, and the sampled trees were in pots. Please include a discussion of stress – was CO<sub>2</sub> exchange measured? Was there any way of assessing the stress status of the trees compared to what might be expected in their planted urban habitat?

Page 3148, lines 24-26: Only large flowered species were sampled – do the authors think it possible that small flowers might be very strong VOC emitters, thus ignoring such a large % of species might result in high uncertainties in the subsequent work?

Page 3148, lines 26-27: “The rationale for this sampling decision was that these tree species would be most likely to invest resources into floral BVOC production for the purpose of pollinator attraction.” I think that it’s quite possible for large showy flowers to have no VOC emissions at all, and that their size and colour alone attract insects. Conversely, some small insignificant flowers can have a very strong perfume – and hence large VOC emissions. A sensitivity study might help to give an idea of the uncertainties associated with these sampling issues.

### **Experimental-sampling**

Page 3149, line 12: should this be “minimal contact of foliage and flowers with the bag”?

Page 3149, line 16: please explain why the air had to be cooled before entering the bag enclosure, and what the difference in temperature was between bag air and ambient. Wouldn’t the foliage and flowers emit less VOCs in cooled air, compared to ambient external conditions?

Page 3149, line 24: the internal standard mixture was introduced at 6.5 ml min<sup>-1</sup> – so what was the concentration of this standard in the bag enclosure?

Page 3150, lines 1-2: how strong an adsorbant is Carboxen 1016 for the compounds of interest? In the event of breakthrough from the Tenax (which I assume was first in line in the multi-bed trap), VOCs would be adsorbed onto the Carboxen 1016. If this is the right assumption, would Carboxen 1016 release all the VOCs of interest for analyses, and would all the VOCs of interest be able to “breakthrough” Carboxen 1016?

Page 3150, lines 5-6: it seems that emissions were sampled for 1 hour – please explain if there are issues/risks associated with such a long sampling time of these reactive compounds.

Page 3150, lines 7-18: It’s not clear how many different trees of each species were sampled; we are only told that “...for each tree, a single branch was chosen to be sampled repeatedly...”

Page 3150, line 24: how were the samples stored prior to analysis? For how long were they stored?

**Experimental-environmental monitoring**

Page 3151, lines 16-25: please describe how many sensors were deployed for each environmental variable, and where and how they were deployed, both inside and outside the chambers.

**Results- Hawthorn**

Page 3155 line 15: why no graphs for hawthorn?

***Technical corrections***

In the abstract please include the Latin names of the tree species studied.

Page 3418 line 8: since no questions are posed here, I suggest using the word “issues” instead of “questions”.

Page 3155 line 5: “and  $\alpha$ -terpineoldid show post-blooming increases” – delete “did” at the end of the word “terpineol”.