

***Interactive comment on “Methyl chavicol:
characterization of its biogenic emission rate,
abundance, and oxidation products in the
atmosphere” by N. C. Bouvier-Brown et al.***

Anonymous Referee #1

Received and published: 16 January 2009

General comments The paper describes measurements of methyl chavicol in a forested environment, details its abundance, diurnal variation, gives an estimation of its emission rate and identifies two oxydation products. The measurements are based on the simultaneous use of several instruments (including GC-MS and PTR-MS technics) and the quality of the data is demonstrated through different tests and the overall good co-variation observed for methyl chavicol measurements by the different instruments. As this compound has significant emission rates and a lifetime sufficient to escape the canopy, the authors conclude it could have an impact on the regional atmospheric chemistry and should be therefore explicitly considered in atmospheric chemistry models. The paper is well written and gives new insights into this biogenic VOC and there-

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fore is recommended for publication in ACP, once the comments detailed below have been addressed.

Specific comments

-the introduction is focussed on methyl chavicol current knowledge. It should give as well a brief introduction on α -pinene and especially on MBO as these compounds are compared to methyl chavicol in the paper (and emissions rates of methyl chavicol are scaled by the MBO emission rates).

-measurement section: resolution time of the different measurement should be given. In the section 3.1, the slight differences are attributed to the different sampling times. We note however that PTR-MS measurements are always below GC-MS measurements during the day, which may be surprising as measurements of the GC-MS are more specific and, if any difference, it would be expected that the GC-MS results are lower. Please comment on that.

- the first section of the results part is a bit confusing and gives too many information in a too short description. Indeed in three short paragraphs, the following issues are presented: inter-comparison of methyl chavicol measurements by the different instruments, observed mixing ratios, diurnal variation, description of the variability according to meteorological parameters, comparison with other compounds and then in the section 3.2 diurnal variability is again discussed. In the current version, discussion on the consistency of the results obtained by the different techniques is mixed up with discussion of the diurnal variation and the parameters controlling this diurnal variation. This confusion leads to missing information for the different issues. For example, figure 4 is given for the comparison between the different techniques but is it for a specific day? Is it averaged over the whole campaign? Concerning the diurnal variation, different informations are mixed up: what is observed here, what was observed in enclosure experiments, discussion of the vertical mixing in the canopy and of the oxidation in the canopy (but these two last points are closely linked with the discussion which comes

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in section 3.2) Therefore it is recommended to dedicate the first results section only to methyl chavicol (describing the consistency of the different instruments, its abundance and variability during the campaign) and in a separate section to comment on the comparison with other compounds levels and variability. It is also suggested to gather all information discussing the diurnal variability in a same section.

-page 19719, line 4-11: this part is not clear. The first sentence notes 'the significant methyl chavicol observed at night' and the sentence just after describes 'low nighttime mixing ratios', and finally a short discussion is made on these levels. Clarify what is discussed here (significant or low levels?)

-figure 6 A and 6B: represent diurnal variations of the BVOC at different heights (6A 1.5 m and 6B 9.3 m) but also at different periods (6A warm period and 6B cool period). It would be helpful to present at first measurements at heights 1.5m and 9.3 m for the same period (for example the warm period), in order to demonstrate what is said page 19718, line 28 (i.e. 'ambient methyl chavicol were largest in the lower canopy'), that would then be figure 6 and 6 B. And then it could be shown the variations of methyl chavicol (at 1.5 m and or 9.3 m) during the cool period in an additional figure. If data at different heights are not available at the same period, it is suggested to label the second figure 'figure 7' rather than 'figure 6B'.

- following the suggestion above about remodelling the sections of the 'results' part, it would then be recommended to separate the section on emission rates (based on some assumptions) from the section on diurnal variation (which is more a description of an observation and the parameters controlling the variations). Eventually the sections concerning 'emission rates calculations', 'atmospheric implications' and 'oxidation products' could be separated in the 'discussion' part.

-emission rates discussion: it is not clear to me to which emission rates estimated in this paper the emission rate range given in the introduction (line 27) should be compared with.

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-what is the lifetime of the identified oxidation products?

Technical comments

-Table 1: what is primary/secondary references? (Sometimes only secondary references are given)

-use consistently 'day of the year' or the 'date' (see for example section 3.1, in the text dates are given, in the figure 'day of the year' are given which makes difficult to follow the discussion)

-be more precise in the figure captions (for example figures 6 -according to the text-represent mean diurnal variations over specific days, give this information in the figure caption).

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 19707, 2008.

ACPD

8, S10475–S10478, 2009

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