

***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 #2

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General comments This paper reports atmospheric measurements of methyl chavicol and its diurnal variations during warm and cool periods in a ponderosa pine forest. It presents its estimated biogenic emission rates, atmospheric lifetime and oxidation products. Although the sampling strategy has not been made with proper care with regards to the vertical gradient of biogenic emissions (i.e, 1.5 m height during warm period against 9.3 m height during cool conditions) and the measurements were limited only to few days, the data obtained using GC-MS and PTR-MS, will be useful and of interest to the community, adds a new compound into the list of biogenic VOCs and could be published once the following comments have been considered.

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Specific comments - Experimental: -Details about how many air samples were analysed and how frequent was the calibration of GC-MS are missing and should be presented. -specify the nature of mass spectrometer in the Berkeley GC-MS (quadripole or ion trap). -Because the authors used a special way to calibrate methyl chavicol, more details should be provided in the text concerning the mixing, how homogenous was the injected methyl chavicol throughout the line, Since methyl chavicol is a semi-volatile compound, how can the authors make sure that it would not condense into the sampling line after injection at 100 °C. What was the temperature of the calibration line? It should be similar to the sampling line. -Some details are missing in the following sentence (page 19713, 2nd paragraph, by manually injecting diluted liquid standards (with which solvent?) where the injector port was heated at 100°C. This standard flow was then sub-sampled at ~20 mL min⁻¹, it is not clear to me, do you mean into Tenax ? -Which kind of ozone scrubbers did the authors use?

-Results and discussion: Methyl chavicol mixing ratios - Page 19718, line 8-14: while the emissions of monoterpenes increase immediately following wetting by rain, the emissions of MBO and methyl chavicol do not increase until few days after rain when temperature begins to increase and full light is available. It appears surprising to me since the emission of monoterpene is also light and temperature dependent. The authors should explain that. - Page 19718, line 15-20: if methyl chavicol represents 15% of total terpene mass measured at 1.5 m during the warm period and 36 % at 9.3 m during cool period, what would be the comparison at the same height between warm and cool periods?

-Methyl chavicol emissions - Page 19718, line 27-28: the authors concluded that because ambient methyl chavicol, MBO, and monoterpenes mixing ratios were largest in the lower canopy, their emissions are local and biogenic in origin. This can be true only if the vertical gradient (lower to higher canopy) of emissions has been made during the same warm or cool conditions to draw such conclusion. - The authors should discuss the significant difference between night-time mixing ratios of methyl chavicol

during warm period (Fig. 6A, around 200 pptv) and cool times (Fig. 6B, close to 0 pptv) and comment how can this be related to the emission from storage pools. Overall the explanations about the night-time emission of MBO and methyl chavicol are presented succinctly and not convincing (e.g., 1st paragraph of page 19719).

-Conclusion: Page 19723, 1st paragraph: the estimated methyl chavicol basal emission rates from ponderosa pine trees during cool and wet conditions (i.e., 3-10 $\mu\text{gCg}^{-1}\text{h}^{-1}$), higher than those during warm and dry conditions (0.7-4.3 $\mu\text{gCg}^{-1}\text{h}^{-1}$), appear surprising to me assuming that the basal conditions (high temperature and optimum PAR) of emission are much more available during warm and dry periods.

Technical comments:

-Abstract: Avoid repetition, a ponderosa pine forest in Sierra Nevada Mountains of California, was reported twice. - Experimental: if the average height of ponderosa pine is 8 m, how 1.5 m above the forest floor would be within the forest canopy? May be below the forest canopy would be better. -Sometimes 9.3 m is reported as the height above the forest floor which I assume correct and in some area of the text it is referred to the height above the forest canopy (e.g., page 19714, line 6; 19715, line 1), it should be consistent throughout the manuscript.

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

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