

Interactive comment on “Observations of elevated formaldehyde over a forest canopy suggest missing sources from rapid oxidation of arboreal hydrocarbons” by W. Choi et al.

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This paper describes measurements of formaldehyde over a forest canopy at the Blodgett Forest field site in California over a 4-week period in 2007. Evidence is presented that on warm, sunny days the formaldehyde levels are higher than can be explained, suggesting strongly that the formaldehyde is being produced in the canopy, possibly from very reactive biogenic hydrocarbons. Regardless of the factors controlling the HCHO on “Low” days, the evidence seems to point to an additional source on the “High” days.

Unfortunately, only four such days were present during the month-long study period,

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which raises the question of just how representative they are. The only data from individual days are cramped into Figure 4, and otherwise averages are shown. It would be good if the authors could expand maybe days 259-266 so that the individual days were discernable. That way it would be possible to see if the results were being unduly impacted by an outlier.

A large part of the discussion focuses on formaldehyde produced from acetyl radicals. However, there is no mention of acetaldehyde concentrations. I think it is critical to discuss the possible contribution of acetaldehyde in this context.

The results as they stand are fairly convincing. The paper is quite well written, with errors in places. The referencing is quite bizarre at times, and some references to original work should be included. As described above, the figures are not always as informative as they could be. Overall, the paper can be published after minor revisions.

P9842, L 17: Hozinger should be Holzinger

P9848, L 14. What is the integration interval? Is that value per cm^{-1} or just across the line width?

P9851, L 10: Is Tuazon and Atkinson the correct/best reference for $\text{NO} + \text{O}_3$?

P 9851, L 15. What does this mean? If NO_x data is available for days 245-279, then it includes the HCHO measurement period (days 259-277).

P 9860, L 5. I would not say that HCHO reaches an equilibrium (which is clearly not the correct description). Looking at the data, I would not even say it reaches steady state, it simply passes through a minimum. So the mention of the HCHO lifetime is not really relevant.

P 9863, 2 paragraphs starting L 19. I am not sure how germane this discussion of OH recycling is. Since the present measurements offer no new evidence for OH recycling it doesn't seem like this discussion adds anything to our understanding, and the authors do not make it clear if this is a region where such reactions would be important.

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Appendixes. In general, I would suggest adding a reference to an Atkinson review (IUPAC, for example) and using that and/or the review article by Tyndall et al., which is already in the reference list, for rate constants and mechanisms.

P 9865, L 5. NACR should be NCAR.

P 9867, L 8-10. The reaction numbers do not agree with the reactions below.

P 9868, Equation (C2). I am not sure if the factor of 0.95 is correct. It is probably taken into account in measured HCHO yields, and hence is included in the 0.63. In any case, neither lab nor field measurements are accurate enough to warrant a factor of 0.95 being included!

P 9869, L 6. The MeGLY lifetime of 16 hours is calculated for an OH concentration of $1E6$. For the conditions given here, OH is 4 or 5 times larger, and the MeGLY lifetime correspondingly shorter.

P 9869, L 11. "pathways of PA radical is" should be "are".

P 9869, L 11. LaFranch should be LaFranchi

P 9869, L 15. Beine and Krognes not an appropriate reference, use Atkinson.

P 9870, L 7. As far as I can tell, Takezaki et al. measured decomposition rates of dimethyl peroxide. So, the chemistry concerns methoxy, but not methyl peroxy, which is implied here. As suggested earlier, use a recent review for the CH_3O_2 reaction mechanisms.

P 9876, L 26. Raidation should be Radiation.

Table 2. Not good references for OH + isoprene or MBO.

Footnotes. Fantech should be Fantechi, raidcal should be radical.

Figure 5. BEAERPEX should be BEARPEX.

Figure 10. Would it be possible to reverse the order of the species in the legend? Right
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now, the figure reads bottom to top, but the legend reads top to bottom. Thanks.

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