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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Evidence for a significant proportion of Secondary Organic Aerosol from isoprene above a maritime tropical forest" *by* N. H. Robinson et al.

Anonymous Referee #3

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General Comments:

The authors use results of a field study in Borneo to identify and estimate the contribution of compounds derived from the oxidation of isoprene to ambient SOA formation. HR-ToF AMS and GC x GC measurements of ambient aerosol and correlations with gas phase products of isoprene oxidation provide evidence that m/z 82 signal (probably from methylfuran formed by thermal decomposition during analysis) can be used as a tracer of a component of the aerosol formed from isoprene oxidation. Convincing arguments are made as to why the observed methylfuran must be a decomposition product and reasonable suggestions are made as to the nature of the parent com-

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pounds. Measured ambient signals are used with those from standards to estimate the contribution of this material of isoprene SOA. The manuscript is clearly written and the arguments are presented logically. The conclusions, especially the quantitation, are probably somewhat speculative, but I think the methodology holds great promise for understanding much more about the importance of isoprene to SOA formation, and the results should inspire a significant amount of activity in the field and lab to further evaluate and improve on the approach. I think the paper is suitable for publication in ACP.

Specific Comments:

1. Page 25549, lines 12-23: I suggest stating the material used for the 30 m sampling tube and also calculating estimates of possible gas and particle losses by diffusion in this tube and subsequent sampling lines.

2. Page 25557, Section 5: I think it should be stated somewhere in the text that an important (unstated and not clearly justified) assumption of the mass estimate of MF related aerosol is that the ambient compound(s) that give m/z 82 decompose to MF on the vaporizer and not after electron ionization. Otherwise, there is no reason to expect that the ratio of the m/z 82 signal:total MF organic signal is the same for the ambient sample and MF standard. This is because electron ionization of MF and the types of compounds suggested here to possibly be responsible for the ambient m/z 82 signal are very unlikely to have similar fragmentation patterns. Some justification for this assumption might be available if the retention time of the m/z 82 peak in the GC x GC analysis that is attributed to the ambient aerosol compound(s) has the same retention time as MF, indicating that at least when heated during GC analysis the ambient compound(s) decompose to MF.

3. Figure 5 caption: I do not understand what these data points are. The caption says median values for the boundary layer for a single flight. From that description it sounds like there should be a single point that was representative of the boundary

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layer. Further description of what each point represents is needed.

Technical Corrections:

1. Page 25549, line 6: “Eath’s” should be “Earth’s”.
2. Page 25551, line 11: Should “(2010)” be “(2011)”?
3. Page 25553, line 24: I think perhaps “atmosphere” should be “boundary layer”.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 25545, 2010.