Atmos. Chem. Phys. Discuss., 11, C10564–C10566, 2011
www.atmos-chem-phys-discuss.net/11/C10564/2011/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "SOA formation from the atmospheric oxidation of 2-methyl-3-buten-2-ol and its implications for $PM_{2.5}$" *by* M. Jaoui et al.

Anonymous Referee #2

Received and published: 18 October 2011

General Comments

The results of smog chamber studies of the SOA products formed from the oxidation of the biogenic compound 2-methyl-3-buten-2-ol (MBO) under high and low NOx conditions and in the presence and absence of acid seed particles are presented. Particle phase products were derivatized and analyzed by GC-MS and gas phase carbonyls were derivatized and analyzed by HPLC. It was determined that one significant product, dihydroxyisopentanol (DHIP), is characteristic of this reaction and thus suitable as an atmospheric tracer. Results on DHIP product yields and SOA yields were used with ambient measurements of DHIP to estimate the contribution of the oxidation of MBO, which is a significant biogenic emission, to atmospheric SOA. This approach to source apportionment of SOA is a promising one, and provides valuable new informa-

tion. The laboratory and field measurements were well done and the interpretation of mass spectra seems reasonable. The paper is for the most part well written (see technical comments), with appropriate figures and tables. I think the paper should be published in ACP after the following comments have been addressed.

Specific Comments

1. It would be useful to note the approximate atmospheric lifetimes of MBO with respect to reactions with OH and O3.

2. Is the any evidence or expectation for photolysis of carbonyls in these experiments?

3. At the high HO2/RO2 ratios expected for these experiments one would expect hydroperoxide formation. Would these be detected? Is it known what happens to these when processed with the derivatizing agents?

2. Page 24056, lines 2-4: Why isn't the XAD-4 coated with derivatizing agent to help avoid the chromatographic behavior in the denuder that causes losses?

3. Was anything done to try to evaluate wall losses of the reaction products like DHIP? For instance, Loza et al. (EST 2010) have observed significant losses of small molecules like glyoxal at high RH.

4. DHIP and some of the other products seem rather volatile to be in SOA at such low mass loadings. Some discussion of expected compound vapor pressures and gas-particle partitioning, as well as the possibility that these compounds are bound reversibly to other compounds in the particles would be helpful.

Technical Comments

1. Abstract, lines 3-4: I think either "dynamic" or "steady-state" needs to be replaced by "batch" or "static". It would also be useful to use just two of these terms throughout the paper.

2. The authors tend to use the word "found" a lot, such as in "the yield of X was found

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to be Y", when it would be better to just write "the yield of X was Y".

3. Page 24046, line 2: Should be "relatively low".

4. Page 24047, line 11: The phrase "limited number of" is not very informative. I suggested replacing with "few".

5. Page 25054, line 20: "substituent" should be "substituted".

6. Page 25054, line 25: "hydrocarbons" should be "hydroxycarbonyls".

7. There are quite a few other typos and grammatical errors in the text that I did not attempt to correct. The paper needs another careful reading by the authors.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 24043, 2011.