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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Biogenic oxidized organic functional groups in aerosol particles from a mountain forest site and their similarities to laboratory chamber products" *by* R. E. Schwartz et al.

Anonymous Referee #2

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General Comments

This manuscript presents results of measurements of the organic functional group composition obtained by FTIR analysis of aerosol collected from a Canadian forest. In addition, particle elemental composition and mass spectra, and VOC emissions and reaction products were measured. Biogenic and anthropogenic organic matter (OM) factors were determined using Positive Matrix Factorization to analyze the functional group data and through factor correlations with other measurements. The study contributes rare and important data on biogenic OM functional group composition that is

consistent with laboratory studies on biogenic SOA, and the correlations support a number of interesting hypothesizes, including an influence of dust on SOA formation and a role for cloud chemistry. The study is well done, using an impressive array of state-of-the-art analytical tools and methods, and demonstrates the value of FTIR analysis as a means of obtaining valuable chemical information not available with other methods. I believe the paper should be published in ACP after these minor comments are addressed.

Specific Comments

1. Page 4803, lines 22-25: The suggestion that the correlation between dust and the biogenic factor may be due to adsorption of products of BVOC oxidation onto dust particles can be made stronger by estimating the mass of organics that could adsorb in a monolayer onto the dust surface area. The dust surface probably wouldn't have much impact on adsorption beyond a monolayer.

2. Page 4803, lines 26-29: I don't think the correlation between the biogenic factor and the product of OM and BVOCs necessarily supports the Odum 2-product model any more than it supports, for example, the Donahue basis set model. The correlation probably supports any kind of SOA absorption model, but since surface area should scale with OM it also could be consistent with an adsorption or absorption/adsorption model [Pankow (1994) Atm. Env. 28, 185-188].

3. Page 4804, lines 7-10: Please be more specific about what is meant by "an accumulation effect". Do you mean that as SOA is added the surface area increases so the rate of condensation accelerates?

4. Page 4806, lines 1-4: "Reactive" is probably a better descriptor for aldehydes than "unstable". You might mention that losses could be due to photolysis [Pan et al. (2009) ACP, 9, 3851-3865] or oligomerization reactions [Jang and Kamens (2001) ES&T, 35, 4758-4766].

5. Is the combustion factor thought to be POA or SOA? There's not much discussion of this factor.

Technical Corrections

1. None.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 4789, 2010.