

Interactive comment on “Quantitative estimates of the volatility of ambient organic aerosol” by C. D. Cappa and J. L. Jimenez

Anonymous Referee #2

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General Comments

The authors present results of modeling studies of thermodenuder profiles of organic aerosol measured in Mexico City, carried out to estimate the volatility distribution of organic aerosol compounds. A variety of models are used to fit the profiles and the results are interpreted using a volatility basis set approach. The relative volatility of organic aerosols from a number of different sources is determined as well as the contributions of semivolatile and nonvolatile components. The manuscript appears to be technically sound and the modeling studies are extremely thorough, comprehensive, and carefully done. This is a topic of considerable interest in the atmospheric aerosol community and the paper makes important contributions to knowledge about organic aerosol volatility and the capabilities and limitations of thermodenuder analysis as a

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method of measuring volatility distributions. I think the paper is of high quality and should be published in ACP.

Specific Comments

1. Page 1907: What is the averaging process used to obtain average thermograms? Is it possible that a simple arithmetic average is not appropriate for these nonlinear profiles and leads to some kind of artifacts? It would be interesting to compare analyses of two thermograms and then their average.

2. Page 1910: Is the result with $C^* = 10^{-15}$ ug/m³ different from 10^{-14} or 0? I ask because this C^* value corresponds to ~ 1 molecule/m³ of air, which means that for the flow rate of 0.6 LPM and 160 min measurement period, in which 0.1 m³ of air is sampled, ~ 0.1 molecules would pass through the thermodenuder. How can the result be sensitive to this value?

3. Page 1912: Does a meaningful comparison of the volatility distributions reported here with those in the literature for different systems require that the data be analyzed using the same methods and assumptions (such as evaporation coefficient)?

4. Page 1914: I am more concerned than the authors about the possibility that heating impacts oligomer formation. This will depend on the particular reaction. One would expect that ester formation from reactions of organic acids and alcohols would be enhanced with heating since the reaction involves loss of water. On the other hand, hemiacetals may decompose at higher temperatures since the reaction is a simple, reversible dissociation to an alcohol and aldehyde and would be enhanced by the favorable entropy increase.

Technical Corrections

1. Page 1915, line 3: "this" should be "these".

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 1901, 2010.

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