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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Simulating the oxygen content of ambient organic aerosol with the 2D volatility basis set" *by* B. N. Murphy et al.

Anonymous Referee #2

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General Comments

The authors present a comparison of field measurements of aged organic aerosol (OA) in Greece, including OA mass concentrations and O/C ratios measured with an Aerodyne AMS, with predictions of a new two-dimensional volatility basis set model they have developed. The addition of O/C ratio (the second dimension) to the model predictions is a natural one given that such measurements are now routinely made, and helps to constrain the model and provide insight into the aging process. The new model and the justifications for the range of parameters used in various components are thoroughly discussed and well referenced. The agreement between the mean OA and O/C measurements and the base-case model are remarkable (within $\sim$5%), suggesting that the approach has promise. The sensitivity tests on various model inputs

are also useful. I found no serious problems with the manuscript and think it should be published in ACP after Comment #1 has been addressed.

Specific Comments

1. As noted above, the base-case model results for the mean OA concentration and O/C ratio compare remarkably well with the ambient measurements, especially considering the large uncertainties in many model inputs and the fact that the community regularly reports 1-2 order-of-magnitude discrepancies in OA predictions. The study is presented as if the modeling was carried out with complete ignorance of the measurements. Is this the case, or did the modelers peak at the field results before completing the modeling, and if so, were any base-case parameters or other components of the model selected or adjusted in order to improve agreement? I don't view this as a problem, but it should be discussed lest readers be misled as to some of the reasons for the remarkable agreement, which I would view as bordering on the miraculous.

2. Although outside the scope of this paper, it would be very interesting if the authors carried out a similar study in their smog chamber with a mixture of aromatics, alkanes, and terpenes, in which they would have even better knowledge of the precursors and the oxidation conditions. To my knowledge, this has not been done. I think the authors have typically used chamber data to obtain parameterizations for use in ambient models, but not to test their models for a simulated complex atmospheric system. Presumably the model could perform as well or better than it did in the field.

Technical Corrections

None.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 8553, 2011.