**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Evaluation of the volatility basis-set approach for the simulation of organic aerosol formation in the Mexico City metropolitan area" *by* A. P. Tsimpidi et al.

Anonymous Referee #1

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This paper examines a volatility basis-set approach to the simulation of organic aerosol formation and concentrations in Mexico City. This work is a timely application of an important new development in organic aerosol partitioning between the particulate and vapor phases. The site chose to evaluate this approach is challenging due to incomplete knowledge of the volatility distribution of the primary organic emissions and the complexity of the chemical environment studied. Given that, the paper expresses suitable cautions about the significance and confidence levels that should be applied to the simulation results. A number of assumptions employed in parameterizing the model seem somewhat arbitrary, e.g., the volatility distribution of the emissions, the rate parameters employed to models some of the reactions, and the percentage of mass that

is added to a class upon oxidation. A analysis of the sensitivity to these assumptions would be appropriate. The authors do explore the model sensitivity to the volatility basis set that is assumed for the emissions by performing 3 simulations with different assumed volatility basis-sets. While this is far from a comprehensive sensitivity analysis and further analysis of the parameters employed in the model is clearly needed, the paper develops sufficient new insights into the origins and evolution of the Mexico City organic aerosol that the additional analysis can reasonable be left for future work.

While the technical content of the paper seems to be in good order, the graphics need some work and the paper needs to be carefully edited. The major data presentation is in the form of color maps of the region of study. A map of the model domain is also presented in Fig. 3. Unfortunately, either the scale and region covered in the geographical map differs from that shown in the data plots, or the aspect ratio of the data plots is distorted.. Moreover, only a few locations are identified in both types of plots; the data map only includes a few specific locations that are in the geographical map, and no geographical boundaries or other features to help the reader orient himself/herself with respect to the map. This should be remedied by incorporating the geographical information into the background of the data plots, and by clearly identifying the model domain in the map. Also, black labels on dark blue on the data plots are not legible – make certain that all information in the data plots is easy to read.

A few editorial points are:

p. 13697, l. 11: The AMS ... has been the most commonly used over the last few years. (or ... in recent years.

p. 13709, l. 19: nand – should be "and".

p. 13710, l. 8: insert comma after "average".

p. 13710, l. 22: replace "there are less oxidants available" with "less oxidant is available" or "fewer oxidants are available."

p. 13711, l. 22-25: The long sentence beginning with "Finally ..." is very difficult to follow.

p. 13713, l. 5: Replace "thereby" with "therefore."

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 13693, 2009.