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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Sources and production of organic aerosol in Mexico City: insights from the combination of a chemical transport model (PMCAMx-2008) and measurements during MILAGRO" *by* A. P. Tsimpidi et al.

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1. *This manuscript is a well-written, clearly structured description of the application of the PMCAMx-2008 model (which uses the well documented volatility basis set module) to the Mexico City area during the MILAGRO 2006 period. It focuses on the prediction of organic aerosol and its temporal and spatial evolution. This is a topic of much interest within the atmospheric chemistry community and therefore is well within the scope of ACP. The title and abstract are appropriate, and the citation of previous work is more than adequate. I have no major technical criticisms of this manuscript. How-*

ever, I do not believe that the paper presents any new techniques or ideas; it seems to be a pretty standard model application and comparison to data measured in the ambient atmosphere, with a sensitivity study. While I recognize that this is an important exercise, it is for this reason that I do not rate the paper higher than fair in the significance category, especially since the model findings support the hypotheses made by interpretation of the measurement data. That being said, the methods used are clearly outlined, as are the assumptions made. The interpretation and conclusions appear correct based on the model output data presented.

The use of the volatility basis set framework in atmospheric chemical transport modeling has indeed been described in our previous work (Lane et. al., 2008a, 2008b; Shrivastava et al., 2008; Murphy et. al, 2009; Tsimpidi et. al, 2010). In this work, we focus on testing this framework and more importantly the corresponding parameters (e.g., aging rate constants for semi-volatile anthropogenic vapors) against one of the best available datasets in a highly polluted urban area. This is an excellent test of how the organic aerosol module that we are using can perform in an area where most previous organic aerosol modeling efforts have had serious difficulties in reproducing observations. The availability of observations not only in the center of the city but also in the suburbs and outside the city provide a valuable test of the current state-of-the-art in atmospheric organic aerosol modeling in a polluted megacity. This is clearly a necessary step before the model can be used for the investigation of the efficiency of different emission control measures.

The major methodological improvements in the current work are related to the inputs used for the modeling including: an extended modeling domain to cover sources outside the city, improvements of the emission inventory, extension of the study to a full month (instead of the few days that have often been used in the past), etc.

Suggested minor corrections/changes:

2. *Page 27929, line 8, I would suggest changing "reduced" to "decreased" as reducted*

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also has a chemical meaning.

This has been corrected in the revised manuscript.

3. *Page 27935, line 17, T1 is "a" suburban site, not "an" suburban site*

Corrected.

4. *Page 27938, line 3, "tend" not "tent"*

Corrected.

5. *Figures 4 and 13 should be modified. First, it also would be appropriate to show some x-y plots of observations versus measured to give an overall picture of how well the model captures the temporal variability, which is difficult to determine from the time series as shown. In addition, I recognize why the authors put all three plots on the same scale on the y axis. However, doing so decreases the ability of the reader to see the true dynamics of the behavior in the T1 and T2 panels. I would suggest showing the T1 and T2 plots on a smaller scale and noting in the caption that the scales on each panel are different.*

The suggested modification of the figures has been made in the revised manuscript. An x-y plot of the predicted versus the observed values has been also added.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 27925, 2010.