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Atmospheric Chemistry and Physics Discussions

# *Interactive comment on* "Chemically-resolved aerosol eddy covariance flux measurements in urban Mexico City during MILAGRO 2006" *by* R. Zalakeviciute et al.

**Anonymous Referee #2**

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General comments

Zalakeviciute et al. present concentrations and turbulent fluxes of submicron aerosol compounds at an urban site in Mexico City. They use an aerosol mass spectrometer in an eddy covariance method for direct measurements of aerosol chemical composition and fluxes. In particular, they present the time series and diurnal patterns of the main aerosol inorganic compounds and the organic aerosol subdivided into three classes (fresh, oxygenated, biomass burning). Finally, they compare their emission fluxes with the local gridded emissions inventory of primary PM2.5. So far, only very few direct eddy covariance flux measurements using an aerosol mass spectrometer have



been performed. Such measurements are an extremely useful tool when studying the surface-atmosphere exchange of aerosol compounds. Therefore, the measurements and results presented in this study are very interesting and important, and certainly deserve publication. Before publication, I would like to ask the authors to consider a few minor comments.

Specific Comments

1. p.11904, l.24: Could you add information about the length of the 5/8" copper sampling line, and about the sampling line from the copper sampling line to the AMS.

2. From the PMF analysis, three organic aerosol factors (HOA, OOA, BBOA) were derived. Could you briefly discuss the relevance of a fourth factor (local primary nitrogen-containing LOA) derived by Aiken et al. (2009) in the context of your measurements.

3. p.11910, l.13: What exactly do you mean by "water correction"?

4. p.11913, l.4 and in Fig. 4: Concentrations of olefins are presented. How did you measure the olefin mixing ratios?

5. In section 3.3, the local gridded emissions inventory of primary PM2.5 is compared with the emission flux measurements of this study. I am not surprised that the temporal pattern of the inventory and the observations are different, and that the results are not consistent with earlier studies by Aiken et al. (2009) and Zavala et al. (2009). Many of the primary particles included in the inventory, i.e. black carbon, dust, and metals, were not directly measured with the AMS. Also, when using an average PM1/PM2.5 ratio to estimate a PM1 emission inventory, and when using an average correlation of HOA and BC to parameterize BC concentrations, an interpretation of the diurnal patterns is very difficult. This should be stated more clearly in a revised version of this section.

6. p.11921, l.1: The presented flux measurements are described as a useful method to directly quantify PM1 emissions and deposition within a densely populated urban area. Taking into account my comment above, and the level of sophistication needed

to perform those measurements, this statement should be softened.

7. p.11921, l.15: It is stated that “nitrate aerosol emissions were observed only during evening rush hours with peak levels of 0.4 $\mu$g m-2 s-1”. However, in Fig. 6d, the average diurnal pattern of the nitrate fluxes shows an emission episode at 6 AM in the morning. Please clarify!

Technical Corrections

p.11909, l.14/15: Please revise: “The fractional contributions and the individual mass fluxes were used squared residual minimization of...”.

p.11915, l.13: Replace “MCMA” by “Mexico City Metropolitan Area”.

Tab. 1: To be consistent with the rest of the manuscript, replace “chlorine” by “chloride”.

Fig. 1: For reasons of clarity, please show additional tick marks indicating longitude and latitude.

Fig. 3: For the reader, a time series of the total submicron mass measured by the AMS would be an interesting addition.

Fig. 4: For the reader, the average diurnal pattern of the total AMS mass would be an interesting addition. Also, references for the NOx and CO2 measurements should be included.

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Interactive comment on Atmos. Chem. Phys. Discuss., 12, 11899, 2012.