Atmos. Chem. Phys. Discuss., 9, C1361–C1363, 2009
www.atmos-chem-phys-discuss.net/9/C1361/2009/


Atmospheric Chemistry and Physics Discussions

# *Interactive comment on* "Mexico City aerosol analysis during MILAGRO using high resolution aerosol mass spectrometry at the urban supersite (T0) – Part 1: Fine particle composition and organic source apportionment" *by* A. C. Aiken et al.

**Anonymous Referee #2**

Received and published: 1 June 2009

General comments

The manuscript by Aitken and co-authors provides a comprehensive analysis of High Resolution-Time of Flight Aerosol Mass Spectrometer (HR-ToF-AMS) data collected during the MILAGRO field campaign in Mexico City in March 2006. AMS data are presented in comparison with other data obtained with co-located instruments at the T0 supersite and with aerosol composition data obtained during previous studies in Mex-



ico City. The authors do a good job in stating basic assumptions and related limitations affecting data inter-comparisons. Based on AMS high resolution mass spectra Positive Matrix Factorization is applied in order to apportion organic aerosol (OA). OA apportionment results are compared with the results obtained by means of CMB method on PM2.5 samples. As a whole the manuscript is well written and provides a concise review of the aerosol composition measurements obtained during the MILAGRO campaign, though for a rather short period of 20 days. I recommend the publication of the manuscript with minor revisions concerning the specific comments below.

Specific comments

Page 8384 line 21: I think that the discussion about AMS collection efficiency requires some improvements. First, for the ease of the reader, the author should clearly define the meaning of this CE; second, verification of the collection efficiency here stated partially relies on the plot in Figure S3. Though discussing in depth all the challenges in instruments inter-comparison (mostly related to different size cuts and to different kinds of measured diameters), the authors should better provide evidence for the 0.5 CE assumption.

Page 8384 line 9: It had better to specify the averaging time for time series data.

Page 8394 line 24: The authors make some interesting consideration about night-time OOA and nitrate background levels but they should explain the way the estimate these levels.

Page 8402, section 3.4: I think that the comparison of experimental data with Mexico City emission inventory is a little bit questionable. The authors compare the observed morning peak-hour PM/CO ratio to the same ratio from Mexico City emission inventory in order to draw conclusions about inventory accuracy for PM. This approach is sound but some points need to be better explained. Since emission inventory data are normally referred to the annual basis, while comparing observed and inventory PM/CO ratios the authors should be aware that all the sources considered in the inventory are

active during the period of the field campaigns and affect air quality at the T0 supersite, which appears as a representative site for the urban MCMA. Moreover, the considerations are based on data observed on a 20 days period only. Comparison is based on PM2.5/CO ratio but it is not clear how PM2.5 concentration is estimated based on AMS data. For comparison purpose PM2.5 is related to $\Delta$CO (CO concentration minus regional background): if possible, I suggest to compare also $\Delta$PM2.5/$\Delta$CO ratio to the inventory ratio, with $\Delta$PM2.5 being observed concentration minus regional background. This latter ratio should better represent the real anthropogenic contribution to PM2.5 levels. Morning peak hour is typically dominated by traffic as emission source. Though T0 supersite is supposed as representative of urban MCMA, it would be interesting to have some information about the invetory ratio for the traffic source just as verification of this assumption. Finally, it is not surprising that afternoon PM2.5/$\Delta$CO ratio largely exceeds the inventory ratio sinec PM inventory data normally consider primary PM only. If this is not the case for Mexico City inventory, the authors should state that the inventory ratio considers both primary and secondary emissions. Anyway, the comparison of observed morning and afternoon PM/CO ratios provide an insightin the potential strength of secondary aerosol formation.

Minor comments

Figure S-17. Autocorrelation plot for BBOA factor shows a peak for a lag time of about 8 hours. Though R2 value is rather low, it would be interesting to have some possible explanation for this behaviour

Figure S-19. I find this plot very interesting and I suggest its inclusion in the manuscript (Section 3.2.3).

---

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 8377, 2009.