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## ***Interactive comment on “Measurement of ambient aerosols in northern Mexico City by single particle mass spectrometry” by R. C. Moffet et al.***

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*- P6416, 2nd paragraph: one of the major findings of the MCMA-2003 campaign was that current models underpredict SOA formation from anthropogenic precursors by up to a factor of 8 in MC, and that SOA is a major component of fine particles in MC [Volkamer et al., 2006]. This is an important context for the interpretation of the data from this study, since much of the OC, especially in the afternoons, is very likely SOA.*

RESPONSE: We agree that the Volkamer paper provides some context for this work. It should be noted that the Volkamer paper was based on data acquired in a different year (2003) in Mexico City. In 2006, the ATOFMS detected the largest fraction of sub-micron biomass particles (by number) in the afternoons. These afternoon periods were impacted by PM being rapidly transported into the City center each afternoon from the

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south where the fires were located. The number fraction of biomass particles peaked later in the day after the amounts of the other particles (including aged OC or SOA) had decreased. The overall decrease in concentrations of other particle types partly explains why biomass represented the largest number fraction in the afternoon. In a future paper, we plan to further explore in our single particle data the particle types to which the SOA is partitioning and how the biomass burning seed aerosols are influencing these partitioning processes. Many new and exciting questions can now be posed with this new 2006 dataset. Based on the complexity of the source data that has been reported in our ACPD paper, as well as papers by other authors for this region during MILAGRO, it will be interesting to calculate the range of fractions of predicted SOA over different days and under different meteorological influences in 2006 in Mexico City at T0 and other locations.

- *P6416, end of 2nd paragraph: Johnson et al. (2006) also identified biomass burning emissions as an important source of refractory species in MC. This should also be mentioned here.*

RESPONSE: Yes, a reference to this has been added to the revised paper. It is interesting to note their size range attributed to biomass was in the 0.34-2.5  $\mu\text{m}$  size bin. However, one should also note their reported size range for dust, which was most abundant in the smallest size range. Based on the findings reported in our ACPD paper, we believe these could have been inorganic ash types from industrial emissions.

- *P6420, line 13: the fact that OC particles were one of the most abundant types is consistent with the results of Salcedo et al. (2006) and Volkamer et al. (2006). A significant fraction of the OC in the afternoons is likely SOA.*

RESPONSE: As described above and in the paper, the ATOFMS also detected both primary and secondary OC in the mass spectra of the particles. Notably, as described in the revised manuscript, ATOFMS detected organic particles heavily coated with SOA, but they were not the number one particle type (by number) based on the ATOFMS

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ART-2a clustering analysis. As described in the revised version of the paper, fresh biomass/biofuel burning particles were ranked first by number counts in the submicron size range, aged organics (SOA) ranked second, and aged biomass/biofuel ranked third in the submicron mode. As described in another paper by our group, we detect significant amounts of carbonaceous SOA type particles in the summer in Riverside, CA (a well documented transport site) [Pastor *et al.*, 2003]. Riverside serves as a contrast to Mexico City because in Riverside, aged organic aerosols, not biomass/biofuel burning, dominate the accumulation mode in ATOFMS data. In the Fall in Riverside, when there is less photochemical activity (and more fire activity), we find biomass/biofuel burning particles become more prevalent. Notably, in Mexico City, we were located at T0 which was chosen to be close to many sources—so it is anticipated the fraction of primary particles should be relatively large. As described in the revised paper, fresh biomass particles transported from the south dominate the submicron number fraction, not SOA (OC) particles.

- P6421, line 25: *at this point in the paper is unclear why oxalate is mentioned in the same paragraph as the Vanadium-type particles. Later on the paper does clarify that both components appear to be related, but we suggest making that clear here.*

RESPONSE: High amounts of oxalate ion signals were often coupled with the V particle type. We now make this point more clear earlier in the discussion.

### Summary of response:

In summary, many of the comments by Jimenez and DeCarlo are directly addressed in the revised version of the manuscript by not scaling the ATOFMS data with the APS size distributions, which were determined after the study to have erroneously low counts in the smallest sizes.

Both AMS and ATOFMS have their own set of strengths and weaknesses, and measure some of the same aerosol species, but many different species in different size ranges. Both are used to obtain unique perspectives on the ambient aerosol which

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serve to complement measurements from many other techniques and models. Results from these two approaches should be highly complementary. We will have the opportunity to make comparisons of the ATOFMS and AMS with data from many other participants in the MILAGRO field campaign over the coming year in an effort to learn more about each set of measurements as well as, more importantly, the major sources and processes contributing to the Mexico City aerosol.

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