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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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Other points

- P6416, line 5: we suggest also citing the recently published MCMA-2003 overview paper by Molina et al. (2007), which summarizes the observations from that campaign. This paper discusses BB in some detail as a potentially important source of fine PM in MC.
- 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

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from this study, since much of the OC, especially in the afternoons, is very likely SOA.

- 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.

- 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.

- 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.

- P6422: the association of nitrate and dust types described here is consistent with the paper (published after this one) of Fountoukis et al. (2007).

- P6426, line 10: the Kelvin effect only plays an important role for particles below 100 nm, so it cannot explain the differences between the sub and supermicron modes reported here, since the submicron mode reported here starts at ~400 nm Da (Fig. 3).

Grammar etc.

- P6416, line 2: we suggest replacing “K particles” by “K in particles”, as the Moya et al. study used a bulk analysis technique rather than a single particle technique.

- P6418, line 2: Moffet reference repeated (or missing from reference list).

References

Allen J.O., Fergenson D.P., Gard E.E., et al. Particle detection efficiencies of aerosol time of flight mass spectrometers under ambient sampling conditions. Environ. Sci. Technol. 34, 211-217, 2000.

Clarke A., et al. (2007), Biomass burning and pollution aerosol over North America: Or-

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Discussion Paper

ganic components and their influence on spectral optical properties and humidification response, *J. Geophys. Res.*, 112, D12S18, doi:10.1029/2006JD007777.

Eben S. Cross, Jay G. Slowik, Paul Davidovits, James D. Allan, Douglas R. Worsnop, John T. Jayne, David K. Lewis, Manjula Canagaratna, and Timothy B. Onasch. Laboratory and Ambient Particle Density Determinations using Light Scattering in Conjunction with Aerosol Mass Spectrometry. *Aerosol Science and Technology*, 41:343-359, 2007. DOI: 10.1080/02786820701199736.

DeCarlo, P., Slowik, J.G., Worsnop, D.R., Davidovits, P., and Jimenez, J.L. Particle Morphology and Density Characterization by Combined Mobility and Aerodynamic Diameter Measurements. Part 1: Theory. *Aerosol Science and Technology*, 38: 1185-1205, 2004. DOI: 10.1080/027868290903907.

Dubovik, B.N. Holben, T.F. Eck, A. Smirnov, Y.J. Kaufman, M.D. King, D. Tanre and I. Slutsker, Variability of absorption and optical properties of key aerosol types observed in worldwide locations, *J. Atmos. Sci.* 59 (2002), pp. 590-608.

C. Fountoukis, A. Nenes, A. Sullivan, R. Weber, T. VanReken, M. Fischer, E. Matías, M. Moya, D. Farmer, and R. C. Cohen. Thermodynamic characterization of MC aerosol during MILAGRO 2006. *Atmos. Chem. Phys. Discuss.*, 7, 9203-9233, 2007.

Gross DS, Galli ME, Silva PJ, et al. Relative sensitivity factors for alkali metal and ammonium cations in single particle aerosol time-of-flight mass spectra. *Anal. Chem.* 72 (2): 416-422, 2000.

Klaus-Peter Hinz, Bernhard Spengler. Instrumentation, data evaluation and quantification in on-line aerosol mass spectrometry. *Journal of Mass Spectrometry*, 42, 7 , Pages 843 - 860, 2007.

J. Alex Huffman, John T. Jayne, Frank Drewnick, Allison C. Aiken, Timothy Onasch, Douglas R. Worsnop, and Jose L. Jimenez. Design, Modeling, Optimization, and Experimental Tests of a Particle Beam Width Probe for the Aerodyne Aerosol Mass

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Spectrometer. *Aerosol Science and Technology*, 39(12): 1143-1163, 2005, doi: 10.1080/02786820500423782.

Jayne, J.T., D.C. Leard, X. Zhang, P. Davidovits, K.A. Smith, C.E. Kolb, and D.R. Worsnop, Development of an aerosol mass spectrometer for size and composition analysis of submicron particles, *Aerosol Sci. Technol.*, 33, 49-70, 2000.

K. S. Johnson, B. de Foy, B. Zuberi, L. T. Molina, M. J. Molina, Y. Xie, A. Laskin, and V. Shutthanandan. Aerosol composition and source apportionment in the Mexico City Metropolitan Area with PIXE/PESA/STIM and multivariate analysis. *Atmos. Chem. Phys. Discuss.*, 6, 3997-4022, 2006.

P. Liu, P.J. Ziemann, D.B. Kittelson, and P.H. McMurry. Generating Particle Beams of Controlled Dimensions and Divergence: I. Theory of Particle Motion in Aerodynamic Lenses and Nozzle Expansions. *Aerosol Sci. Technol.*, 22: 293-313, 1995a.

P. Liu, P.J. Ziemann, D.B. Kittelson, and P.H. McMurry. Generating Particle Beams of Controlled Dimensions and Divergence: II. Experimental Evaluation of Particle Motion in Aerodynamic Lenses and Nozzle Expansions. *Aerosol Sci. Technol.*, 22: 293-313, 1995b.

L.T. Molina, C.E. Kolb, B. de Foy, B.K. Lamb, W.H. Brune, J.L. Jimenez, R. Ramos-Villegas, J. Sarmiento, V. H. Paramo-Figueroa, B. Cardenas, V. Gutierrez-Avedoy, and M. J. Molina. Air Quality in North America's Most Populous City - Overview of MCMA-2003 Campaign. *Atmospheric Chemistry and Physics*, 7, 2447-2473, 2007.

Murphy D.M. The design of single particle laser mass spectrometers. *Mass Spec. Rev.* 26 (2): 150-165, 2007.

Pang, Y.; Turpin, B. J.; Gundel, L. A. On the Importance of Organic Oxygen for Understanding Organic Aerosol Particles. *Aerosol Science and Technology* 2006, 40, 431 128-133.

Park, K., Kittelson, D. B., Zachariah, M. R., and McMurry, P. H. Measurement of In-

ACPD

7, S3747–S3751, 2007

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herent Material Density of Nanoparticle Agglomerates, *J. Nanopart. Res.*, 6, 267-272, 2004.

ACPD

D. Salcedo, T. B. Onasch, K. Dzepina, M. R. Canagaratna, Q. Zhang, J.A. Huffman, P. F. DeCarlo, J. T. Jayne, P. Mortimer, D. R. Worsnop, C. E. Kolb, K. S. Johnson, B. Zuberi, L. C. Marr, R. Volkamer, L. T. Molina, M. J. Molina, B. Cardenas, R. M. Bernabé, C. Márquez, J. S. Gaffney, N. A. Marley, A. Laskin, V. Shutthanandan, Y. Xie, W. Brune, R. Lesher, T. Shirley, and J. L. Jimenez. Characterization of ambient aerosols in Mexico City during the MCMA-2003 campaign with Aerosol Mass Spectrometry: results from the CENICA Supersite. *Atmospheric Chemistry and Physics*, 6, 925-946, 2006.

J. Schneider, S. Weimer, F. Drewnick, S. Borrmann, G. Helas, P. Gwaze, O. Schmid, M. O. Andreae, and U. Kirchner. Mass spectrometric analysis and aerodynamic properties of various types of combustion-related aerosol particles. *Int. J. Mass Spec.*, in press, July 2006.

E. A. Stone, D. C. Snyder, R. J. Sheesley, A. P. Sullivan, R. J. Weber, and J. J. Schauer. Source apportionment of fine organic aerosol in Mexico City during the MILAGRO Experiment 2006. *Atmos. Chem. Phys. Discuss.*, 7, 9635-9661, 2007.

R. Volkamer, J.L. Jimenez, F. San Martini, K. Dzepina, Q. Zhang, D. Salcedo, L.T. Molina, D.R. Worsnop, and M.J. Molina. Secondary Organic Aerosol Formation from Anthropogenic Air Pollution: Rapid and Higher than Expected. *Geophysical Research Letters*, 33(17), L17811, 2006.

Wenzel R.J., Liu D.Y., Edgerton E.S., Prather K.A. Aerosol time-of-flight mass spectrometry during the Atlanta Supersite Experiment: 2. Scaling procedures. *J. Geophys. Res.* 108 (D7): 8427, 2003.

Zelenyuk A, Imre D. 2005. Single particle laser ablation time-of-flight mass spectrometer: An introduction to SPLAT. *Aerosol Sci Technol* 39: 554-568.

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7, S3747–S3751, 2007

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