am – 1. Near-field (urban and suburban) chemistry, with emphasis on gas phase.

Summary

Major preliminary findings.

- The VOC / NO_x ratio is shifting toward NO_x over time. As a result, ozone production is shifting more into the NO_x-saturated regime, with potential implications for ozone decreases. At the same time, the atmospheric reactivity appears to be decreasing. Increasing NO_x and decreasing reactivity have a strong influence on the peak value and the timing of the daily O_3 peak.
- The partitioning of NO_y is different from expected. First, the NO_x/NO_y ratio decreases less rapidly with time than expected. Second, particle nitrate appears to be a large fraction of total NO_y.
- Low temperature combustion of nitrogen-containing fuels is impacting the air quality in the Mexico City area. The MILAGRO measurements have the potential to determine the contribution of this burning to urban pollution in Mexico City.
- While secondary organic components form a large fraction of typical aerosol particles, crustal material is significant even in Mexico City. These particles may influence the gas-phase photochemistry in Mexico City through changes in photolysis rates and heterogeneous chemistry, and the chemistry of atmospheric constituents such as HONO.
- Trends appear to be significant in a number of atmospheric gaseous constituents in Mexico City. Determining these trends on multi-year timescales using all the data will require the year-to-year variability of the meteorology during the intensive sampling periods.

Critical needs to move forward

- The full speciation of VOCs and OVOCs are needed for photochemical modeling and for emission source identification.
- Merges of data sets need to be created as soon as possible, even with incomplete, preliminary data. Each aircraft can be merged separately, but ground-based merge would best include all the ground sites. Each merge should include the appropriate meteorological data and model calculations from box, regional, and/or global models.
- Meteorology data from observations and models are needed to understand the variations of atmospheric constituents from both the ground sites and the aircraft and to relate the observations from the aircraft to those from the ground-sites.
- There is a real need for a centralize webpage that summarizes all data-portals and information to access them.

Issues for possible collaborations.

- Quantifying the contributions of biomass burning to the total MCMA urban plume.
- Using weekend / weekday differences in many constituents to learn more about the photochemistry.
- Comparing and combining VOC, OVOC, and inorganic gas observations from ground-based and aircraft to better understand the sources of the emissions and the distributions of these gases and their products throughout MCMA.
- Comparing satellite, ground-based, and aircraft measurements of glyoxal, formaldehyde, and NO_2 – both in situ and column measurements.
- Putting the ground-based data set, including both *in situ* and column measurements, and aircraft data sets, including DIAL and *in situ* sampling, together to learn more about the emissions, meteorology, and chemistry in Mexico City.
- Comparing the missed approaches at Mexico City and Monterey.
- Examining the ground-based and aircraft observations for evidence of meteorological effects, such as the large shift in the meteorology between the early and late parts of the mission?
- Demonstrating the cause of the observed lower ozone in 2006.
- Determining the degree of uniformity of the composition throughout the PBL and its evolution during over a daily cycle.
- Understanding the ozone formation rates and their sensitivity on NO_x and VOCs.
- Comparing the observations at TO, T1, and T2 as a quasi-Lagrangian experiment to examine the evolution of the chemical composition (e.g., 18-19 March
- Comparing O_3/CO ratios from MILAGRO with many previous studies as a tool from understanding chemical evolution from local to regional to global scales.
- Developing a cohesive understanding of the behavior of HO_x and NO_x radicals in the MCMA region.

Possible papers.

1. Formaldehyde distributions and contrast with Houston etc. Are processes similar between cities? (Fried et al.)
2. Nitrogen, OVOCs, and hydrocarbons emissions from the pine forests around MCMA. (Yokelson et al.)
3. Reactive nitrogen partitioning and budget – from local to more regional scales. (Weinheimer et al.)
4. PAN ratios in and around MCMA and downwind before it gets boring. (Flocke et al.)
5. Validation and interpretation of OMI NO_2 during MILAGRO. (Boersma et al.)
6. Low temperature combustion of nitrogen-containing fuels (i.e. burning) in Mexico City – a synthesis. (Crounse et al.)
7. Analysis of the OMI formaldehyde over MCMA and nearby regions. (Millet et al.)
8. PNA and HONO over MCMA, with an eye toward radicals. (McCabe et al.)
9. Relationship between the aircraft and ground methane, CO, nitrous oxide, CO_2. (Diskin et al.)
10. MTBE as a tracer for evaporative and automotive emissions in and around MCMA. (Apel et al.)
11. Weekend and Weekday effect in atmospheric constituents in MCMA. (Stephens et al.)
12. Formaldehyde/CO ratios and formaldehyde/acetylaldehyde ratios: relationship to hydrocarbon precursors and processing time. (Weibring et. al.)
13. CO/O_3 correlations synthesized from all platforms and ground-sites. (Avery et al.)
14. HO_x radical measurements and instrument description. (Stevens et al.)
15. OH/HO2 model as a function of NO – comparisons to models. (Stevens et al.)
16. OH/HO2 model as a function of NO – MCM model. (Volkamer et al.)
17. Photochemical processing of NO_x; HNO_3 data observations between T0 and mobile lab; instrument description (Jun et al.)
18. Box-model evaluation of local gas-to-particle partitioning of Inorganic and organic species – equilibrium and dynamic modeling (Zaveri, Volkamer, Jimenez)
19. Photochemical processing of VOCs - Glyoxal observations,… (Volkamer)
20. Emission inventory from flux tower (Velasco et al.)

21. Open path emission factors of mobile sources FTIR-DOAS (Volkamer et al.)
22. Source apportionment data on VOC using a receptor model 2003/2006 (Mugica et al.)
23. Synthesis VOC intercomparison paper at T0 (Sheehy and Fortner)
24. Gas-phase mercury T0, T1 (Schauer, Cardenas)
25. Gas-phase PAH measurements by DOAS and GC-MS (??)
26. Organic HR-ToF AMS, quantitative OA, oxygen content
27. Source apportionment using positive matrix factorization
28. ATOFMS (Moffet et al.)
29. Nighttime planetary boundary layer
30. Detailed Lagrangian / Eulerian Modelling of the evolution of Mexico City pollutants over the period of 3/18 to 3/19 (Zaveri)
31. Nitrogen speciation & organic nitrates - implications for oxidant formation (Delphine Farmer, UCB)
32. VOC & OVOC from whole-air samples (Angela Baker, UCI)
33. MAX-DOAS column amounts of NO2, HCHO, CHOCHO, HONO at T1/T0 - (Roman Sinriech, Uni-Heidelberg)
34. Impact of Clouds and Radiation on Photolysis Rates at T1 (B Lefer, U Houston)
35. Mixed Layer Particles, Radiation, O3, VOC gradients at T1 (J Greenberg, NCAR)
36. Hydroperoxides from the G1 and at T1 (J Weinstein-Lloyd)
37. HOx levels at the T1 site: Ozone Production and Sulfate Formation (L G Huey, GaTech)
38. Analysis of Oxidant Photochemistry with Models at T1 (Yuhang Wang)
39. IONS(INTEX Ozonesonde Network Study - 06) Ozone Profiles at T1 - Perspective comparison with other sites (A M Thompson, Penn State)
40. Preliminary results on the analysis of PAH by TD-GC-MS at T0/T1 (M Moya, UNAM)
41. Bulk Fine Particle Composition Measured with PILS-IC at T1 (Weber)
42. Mercury concentrations in gas phase and particulate matter at T1 (B Marquez, Cienica)
43. Ammonia Measurements at the T1 Site during Milagro (Fisher, LBL)