Nitric acid and aerosol-associated soluble ions measured on the DC-8 during INTEX-B/MILAGRO

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Nitric acid and fine (< ~ 1.0 micron) aerosol sulfate were measured at 80 second resolution with the UNH mistchamber/ion chromatography system. Soluble ions are quantified by ion chromatography in bulk aerosol samples collected on filters exposed for 5-10 minute intervals. Results from three DC-8 low level passes through the Mexico City Valley (directly over the intensive ground stations) show the impacts of different sources in different regions. Nitric acid peaked (as high as 8 ppb) near T-0 along with CO, while aerosol sulfate showed larger enhancement on the north side of the valley, and continued to increase over the coastal region north east of the city. Aerosol-associated tracers of biomass burning were also elevated throughout the valley, but tended to be highest south of T-0. Soluble calcium enhancements reflect large amounts of dust, with highest levels seen within the city, roughly coincident with the peak mixing ratios of nitric acid. Aerosol nitrate was correlated with calcium, suggesting some uptake of nitric acid by the dust. However, above the city core ammonium mixing ratios were 4-5 times higher than those of sulfate, suggesting that ammonium nitrate also contributed to the measured aerosol-associated nitrate. Sampling downwind of Mexico City over northern Mexico, southern Texas, and the Gulf allowed several encounters with aged pollution from the Mexico City region. Enhancements of nitric acid and fine sulfate in these air masses were generally modest, when compared to levels seen within the Valley.