Ozone Production Rates, Secondary Organic Aerosol, and Changes in Aerosol Light Absorption Based on Observations from the G-1

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The G-1 sampling strategy in Mexico City was focused on the urban source region and downwind regions within a days transport distance. Multiple transects (tens) were flown West and South of the City, over the T0 surface site, and downwind of the City over T1 and T2.

A preliminary set of $P(O_3)$ calculations shows that $P(O_3)$ increases with NO_x up to a NO_x concentration of ~ 15 ppb, then levels off at ~ 30 ppb h^{-1}. $P(O_3)$ is an increasing function of the radical production rate, which in the calculation depends mostly on HCHO and O_3. Precursor concentrations can sustain O_3 production rates of ~ 30 ppb h^{-1} for several hours and thus can lead to high O_3 events absent the competition from dispersion. Calculations indicate that over the City, $P(O_3)$ is strongly VOC limited. Results are compared with calculations for U.S. cities.

In the G-1 sampling domain, the photochemical age marker, NO_x/NO_y, changes from a value near unity over the city to 5-10% downwind. We have used CO as a conservative tracer of urban emission sources and NO_x/NO_y as an indicator of photochemical processing. An 8-fold increase in the ratio [Organic aerosol]/[CO-background] is attributed to SOA production. A 2-fold increase in the ratio (aerosol light absorption)/[CO - background] is attributed to an increase is aerosol mass absorption efficiency.