

AEROSOL AGEING AS OBSERVED FROM THE G-1 AIRCRAFT

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ABSTRACT

The DOE G-1 aircraft was used to measure trace gasses and aerosols, primarily over Mexico City and the Mexico City plateau. We have determined the time evolution of aerosol chemical and optical properties using the ratio NO_x/NO_y as a photochemical clock. This ratio varies from near unity over the city to 0.1 or below near the T2 surface site. Concurrent with a factor of 10 decrease in NO_x/NO_y is a factor of 7 increase in organic aerosol and a 65% increase in light absorption. These quantities are evaluated as a regression slope vs. CO which is used as a conservative tracer of urban emissions. Data filters based on CH_3CN , SO_2 , and the CO/NO_y ratio are used to discriminate against non-urban sources. As an air mass ages, increases in aerosol mass and hence light scattering outweigh increases in light absorption and hence there is an increase in single scatter albedo. A single scatter albedo below 0.85 from urban aerosols is only common in fresh emissions. The amount of VOC precursors needed to account for SOA production is estimated and qualitatively compared with ambient hydrocarbon concentrations.

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