Ground and aircraft measurements of hydroperoxides during the 2006 MILAGRO campaign

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Mixing ratios of hydrogen peroxide and hydroxymethyl hydroperoxide were determined aboard the U.S. Department of Energy G-1 Research Aircraft during the March, 2006 MILAGRO field campaign in Mexico. The mean abundance of hydrogen peroxide was 1.3 ppbv in the mixed layer upwind of the source region, 1.4 ppbv in the source region, and 1.0 ppbv at a site 35 km downwind. The relatively low values we observed can be attributed to high NOx and dry conditions and the relatively low abundance of ozone and hydrocarbons. Peroxide concentrations and production rates were remarkably similar to our observations in Phoenix, AZ in April 1998. Ground measurements of total hydroperoxide were made at the T1 site at Universidad Technologica de Tecamac, about 35 km NW of the center of Mexico City. Diurnal profiles clearly showed local photochemical production, reaching a mean maximum concentration near 1.2 ppbv at 13:30 local time. A second peak in the concentration, coincident with an increase in ozone, frequently occurred shortly after midnight, reflecting transport of photochemical products from the source region.