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USE OF SURFACE AND AIRCRAFT DATA FOR CHARACTERIZATION OF OXIDANT FORMATION IN URBAN PLUMES

P. H. Daum, L. J. Nunnermacker, D. Imre, L. Kleinman, Y.-N. Lee, J. H. Lee, S. Springston, and L. Newman

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Analysis of aircraft and surface data of measurements of the composition of the Nashville urban plume is used to illustrate techniques for extraction of meaningful kinetic information from field observations. Application of conservative tracers and established correlations are utilized to extract: NO_x lifetimes, ozone production efficiencies, OH concentrations, the HNO_3 dry deposition rate, and the relative importance of anthropogenic and natural hydrocarbons to O_3 production. Analysis of the urban plume data revealed a very active photochemical system which consumed 50% of the emitted NO_x within approximately two hours, at an ozone production efficiency of 2.5 to 4 molecules of O_3 for each molecule of NO_x emitted. Anthropogenic hydrocarbons provided approximately 44% of the fuel for ozone production in the urban plume. Comparison is made to oxidant formation processes in nearby power plant plume.