



Impacts of primary formaldehyde on the photochemistry in Mexico City

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The Mexico City Metropolitan Area (MCMA) is characterized with very high mobile emissions of formaldehyde (HCHO), which accounts for about 50% of the total HCHO emissions. The primary HCHO emissions contribute significantly to the HCHO ambient levels. As an important radical source, HCHO with a high concentration may have significantly impacts on the urban photochemistry. In this study, a 3-D chemical transport model (CAMx) is employed to examine the impacts of primary HCHO on the ambient HCHO concentration, the radical budget (radical initiation, propagation and termination as well as radical concentration), and ultimately on the ozone photochemical formation in the MCMA under different meteorological conditions. Simulated HCHO concentrations are compared with concurrent MCMA-2003 measurements, and the simulated partitioning between the primary and secondary sources is compared with results from a statistical analysis. Other important morning hour radical sources, such as the heterogeneous source of HONO is carefully considered or constrained when possible. We find that primary HCHO affects significantly not only the morning hour photochemistry, but also peak O₃ and early afternoon hour radical budgets.