Characterizing ozone production in the Mexico City Metropolitan Area using Chemical Transport Model

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CAMx was used to investigate the characteristics of O3 production in MCMA during an "O3-South" episode by examining the relationship between O3 formation and precursors, which are important to understand the photochemical processes of O3 formation and develop effective control strategies. Model results exhibit a scatter relationship between the O3 production and ambient NOx levels due to varying primary radical production under different NOx levels. High Ox (O3 + NO2) photochemical production rates of 10-80 ppb/hr are predicted due to the high reactivity of VOCs in which alkanes, alkenes, and aromatics exert comparable contributions. The predicted ozone production efficiency is between 4-10 O3 molecules per NOx molecule oxidized, and increases with VOC-to-NO2 reactivity ratio. Sensitivity studies suggest that O3 formation in the MCMA urban region with less chemical aging ($NOz/NOy < 0.4$) is VOC-limited. Both the simulated behavior of O3 production and its sensitivities to precursors suggest that mid-day O3 formation during this episode is VOC sensitive in the urban region on the basis of the current emissions inventory.