

Title

Constraints on NO_x-dependent O₃ production and VOC Reactivity over New York City from measurements of NO₂ columns and surface O₃

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Abstract

UV/Visible spectrometers are capable of making high-precision measurements of the NO₂ column and future measurements of the NO₂ column will provide neighborhood-scale hourly information. We use current measurements of the NO₂ column at 1:30 PM local solar time from the Ozone Monitoring Instrument (OMI) and in situ measurements of surface O₃ from the EPA AQS monitoring system for select summertime days (June, July, August) from 2005 to 2014 to estimate the NO_x-dependence of O₃ production over and downwind of the New York City metropolitan area. From this estimate, we provide constraints on the reactivity-weighted VOC concentration necessary to achieve the observed pattern of O₃ production. Our findings suggest that future hourly NO₂-column measurements will provide valuable near-real time information on the production of O₃ upwind of communities in the wake of NO_x emission outflow.