

# Quantification of ozone formation metrics at Thompson Farm during the New England Air Quality Study (NEAQS) 2002

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Several metrics have been estimated to investigate preliminarily ozone ( $O_3$ ) formation dynamics at the University of New Hampshire Atmospheric Observing Station at Thompson Farm, which is associated with the Atmospheric Investigation, Regional Modeling, Analysis, and Prediction program. This paper focuses on the August time frame of the New England Air Quality Study 2002. These metrics include instantaneous and net  $O_3$  production rate ( $P(O_3)$ ), instantaneous and average  $O_3$  production efficiency (OPE), and hydrocarbon and carbon monoxide (CO) reactivity. In general, the seacoast region of New Hampshire experiences low  $P(O_3)$  values compared to other continental locations. Use of a photochemical model yields a range of instantaneous values of 0.2 to 8.5 ppbv  $h^{-1}$  and a range of net values of 0.2 to 8.3 ppbv  $h^{-1}$ . Corresponding calculations for instantaneous OPE range from 0.2 to 2.4, with regression techniques yielding average OPE values of 7.7 and 9.7. These high regression values, the mixing ratios of  $NO_y$ , and the concentration ratios of  $O_3$  to  $NO_z$  indicate a  $NO_x$ -limited atmosphere. Total hydrocarbon and CO reactivity ranges from 0.9 to 20.2  $s^{-1}$ . In conjunction with back trajectory analysis the metric values calculated for this location indicate that strong peaks in  $O_3$  during this period are most likely a result of mixing of processed,  $O_3$ -rich air masses rather than direct in situ chemical formation.