

4.081 Mechanistic insights and the atmospheric role of isoprene low-NO_x oxidation products.

Early Career Scientist

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Abstract:

Isoprene emissions account for about 50% of atmospheric non-methane reactive carbon. For this reason, assessing the role of biogenic emissions on secondary organic aerosol and ozone formation requires complete understanding of the isoprene oxidation mechanism under a variety of nitrogen oxide (NO_x) concentration regimes. The study of low-NO_x isoprene oxidation products has recently been advanced by the synthesis of key isoprene oxidation products: isoprene hydroxyhydroperoxide (ISOPOOH) and isoprene epoxydiols (IEPOX). We present studies aimed at understanding the oxidation of these compounds in both the gas and aqueous phase. In the gas phase, the NO_x dependence on the formation of small carbonyls including formaldehyde and glyoxal from the oxidation of ISOPOOH and IEPOX will be addressed. In the aqueous phase, studies will focus on the differences in the oxidation mechanism between gas and condensed phase,

the production of hydroxyl radicals (OH), OH reaction rates and particle formation. Together these experiments provide unique insights into the isoprene oxidation mechanism across both NO_x regimes and phase boundaries.