

Interactive comment on “Nocturnal isoprene oxidation over the Northeast United States in summer and its impact on reactive nitrogen partitioning and secondary organic aerosol” by S. S. Brown et al.

Anonymous Referee #2

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Review of "Nocturnal isoprene oxidation over the Northeast United States in summer and its impact on reactive nitrogen partitioning and secondary organic aerosol" by Brown et al.

General comments:

This paper employs aircraft measurements of isoprene, its products MVK and MACR, reactive nitrogen compounds, and aerosols to demonstrate the impacts of the collocation of pollutant NO_x emissions with natural isoprene emissions on the nighttime

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oxidation of isoprene by NO_3 , with impacts on NO_y partitioning and secondary organic aerosol. It is shown that nighttime processes lead to significant isoprene oxidation by NO_3 , and in turn isoprene controls the lifetime of nighttime NO_3 . Additionally, rough estimates are made of the fraction of emitted isoprene that undergoes oxidation by NO_3 , as well as the impacts on the partitioning of reactive nitrogen and on the aerosol burden. This is an outstanding paper. It is clearly and carefully written with significant results. I find little to quarrel with.

Specific comments:

The derivation of equation (10) merits a little more comment. When integrating equation (6), is it assumed that $[\text{NO}_2]$ is constant? Is this justified? And same for $[\text{O}_3]$? Seems $[\text{NO}_2]$ could change significantly. Perhaps less of a concern for $[\text{O}_3]$.

Abstract: "Organic nitrates produced from the NO_3 +isoprene reaction, though not directly measured, were estimated to account for 2–9% of total reactive nitrogen and 7–31% of other long-lived organic nitrates such as PAN." Is this really up to 31% of the other long-lived organic nitrates (if the ones from isoprene are long-lived), or of the total, including the ones from isoprene, this latter being how the partitioning is formulated in the early part of the sentence. Why do it differently?

p 231, typo: concentracions

p. 242, typo: traces -> tracers

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 225, 2009.

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