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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Estimates of non-traditional secondary organic aerosols from aircraft SVOC and IVOC emissions using CMAQ" *by* M. C. Woody et al.

Anonymous Referee #2

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Synopsis: This article attempts to determine the contribution of aircraft emissions to non-traditional secondary organic aerosol (NTSOA). The authors define NTSOA as aerosol formed through the oxidation of semi and intermediate volatility organic precursors. This is done by modifying CMAQ to include the oxidation mechanisms detailed in SAPRC-07. These results are compared to CMAQ modeling using existing precursor oxidation schemes. Aerosol produced from S/IVOC precursors has been shown to be important to understanding regional and local PM burdens from other mobile sources and this work shows that aircraft emissions may not accurately be accounted for in regional air quality models. The findings from this article can provide local and state air

quality divisions much needed information as they seek to identify additional sources of PM. I would recommend this paper for publication pending the modifications detailed below.

Major Comments:

Page 8: If I understand correctly the authors used the 1.5x NTSOA yields for CMAQ simulations. By doing so, does the author apply this factor to all power settings of the aircraft? If not, can the authors comment about how these simulations are expected to differ (if at all) during periods of higher engine power?

Page 9: The authors state that ATL is the world's busiest airport with 2400 flights/day. One would think that the aircraft performing these flights would represent a cross section of engine types. However, the emission dataset is from a single engine type. Can the authors comment on the expected differences in emissions based on engine and aircraft type? Furthermore, the CFM56-2B engine from which the emissions data is generated is an older model engine and becoming obsolete. How might the lowered emissions from newer engines impact the study findings?

Page 13: By stating CMAQ results indicating elevated PM as low as 1 ng/m3, the authors are implicitly stating that model inputs have the accuracy and resolution to realize this value. I have serious doubts that about that. The authors themselves state multiple times about areas of uncertainty in the model inputs (see their discussion on extrapolation of ICAO idle emissions from 7% to 4% power settings).

Minor Comments: None

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 30667, 2014.