

***Interactive comment on “Photochemical processing of organic aerosol at nearby continental sites: contrast between urban plumes and regional aerosol” by J. G. Slowik et al.***

**J. G. Slowik et al.**

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**Response to Referee #2**

We appreciate the reviewer's interest and support. We address the specific comments individually below.

**Comment #1**

Page 24998, line 13: Please state the value(s) or range of values that were used for the collection efficiencies.

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**Response**

This information has been added to the manuscript. For the Harrow AMS, the collection efficiency was mostly at ~0.6 (similar to estimates obtained using both the light scattering and SMPS comparison techniques at a campaign during the previous month; see Slowik et al., 2010). However, during certain periods it increased to ~1. These increases are believed to be caused by increased water content due to temperature gradients between ambient air and the sampling enclosure. For the Bear Creek AMS, a collection efficiency of 0.57 was estimated, which is similar to values reported in other studies and to the non-humid value estimated for the C-ToF-AMS using the light scattering module.

**Comment #2**

Page 25002, line 11: It is my understanding that large alkenes are not present or are very minor in vehicle emissions, such as in unburned diesel fuel or oil. Might this pattern be from alcohols, which dehydrate to give a similar pattern? I suggest providing a reference from emissions literature that supports the alkene speculation by analyses of speciated composition via GC-MS (perhaps by Schauer and co-workers), in addition to the citations of previous AMS observations.

**Response**

We have modified the manuscript. We now note the similarities of the HOA spectrum to those of unburnt fuel and lubricating oil. We also note that the m/z sequence previously attributed to alkenes (i.e. 27, 41, 55, etc.) may result from H2-neutral losses from alkyl fragments.

**Comment #3**

Page 25003, line 1: In addition to m/z 82, there is also a large peak at m/z 31 in UNKN. I think the most reasonable identity of this is a CH<sub>3</sub>O<sup>+</sup> ion with either structure CH<sub>3</sub>O<sup>+</sup> (probably from a methyl ester or maybe an ether) or H<sub>2</sub>C=OH<sup>+</sup> (probably from an

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alcohol). It may be worth pointing this out.

**Response**

We agree and have added this information to the manuscript.

**Comment #4**

Page 25009, lines 20-30: The observation of significant SOA formation during Harrow-to-Bear Creek transport but only small SOA formation during Bear Creek-to- Harrow transport seems to suggest that the major source of SOA is early-generation reaction products rather than aged, well-oxidized VOCs. This indicates that the SOA can achieve a highly oxidized composition without the need for extensive gas-phase oxidation of VOCs. This sounds similar to the Mexico City results and counter to the idea that aging on long time-scales is important in SOA formation. Some comments or discussion along these lines might be worthwhile.

**Response**

We agree that the SOA formation observed during Harrow-to-Bear Creek transport highlights the importance of rapid formation of highly oxidized SOA, and that such rapid processes appear to dominate over the studied timescale. This is now noted in the manuscript. However, because inter-site transport occurs on a timescale of approximately 7 to 9 hrs, we feel our results do not rule out important contributions to SOA from aging processes acting over multiple days.

**Comment #5**

Page 25011, line 27: Should read “: :Detroit/Windsor plume at Harrow: :”

**Response**

The typo has been corrected.

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, 10, 24993, 2010.

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