Atmos. Chem. Phys. Discuss., 14, C7058–C7062, 2014
www.atmos-chem-phys-discuss.net/14/C7058/2014/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Climate-relevant physical properties of molecular constituents relevant for isoprene-derived secondary organic aerosol material" *by* M. A. Upshur et al.

M. A. Upshur et al.

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Annmarie, please find attached our response to the two reviewers' comments, and also our revised manuscript. Please let us know what the next steps are. Thanks! Franz

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/14/C7058/2014/acpd-14-C7058-2014-supplement.pdf

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 17197, 2014.

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Response to Reviewer Comments: Climate-Relevant Physical Properties of Molecular Constituents for Isoprene-Derived Secondary Organic Aerosol Material

Comments from T. B. Nguyen

This work by Upshur et al describes the viscosity, octanol-water partitioning coefficients, and surface tension depression characteristics of four IEPOX isomers and syn- and anti-2-methyltetraol compounds. The main goal of the work is to assess CCN activity of these biogenic compounds. Modeling (GAMMA) and field data comparisons were done to estimate relevant concentrations of IEPOX in the condensed phase (7- 12 mM in certain areas) and measurements covered the relevant range. This is a good physical chemistry study that offers novel information about important compounds in the atmosphere. The manuscript should be published in ACP, after the following comments have been thoroughly addressed.

Detailed Comment #1:

I have reservations about measuring IEPOX with a commercial GC. This is not typically employed for IEPOX measurements, and we are starting to realize the reasons. Now that IEPOX standards are more readily available for study, it has been demonstrated that they are quite labile to decomposition upon heating and especially when sampled through metals in the Agilent GC inlet and sample loop. One of the preliminary results from the recent FIXCIT laboratory campaign (forthcoming manuscripts) is that IEPOX decomposes into methyl vinyl ketone (amongst other products) in the heated sample loop (150 degC) and inlet (155 degC) of a commercial GC before elution through the column. The campaign experiments showed that changing the temperature of the sample loop and inlet changes the decomposition yield. Column choice may still matter in that one selects

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Climate-Relevant Physical Properties of Molecular Constituents Relevant for Isoprene-Derived Secondary Organic Aerosol Material

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Abstract. Secondary organic aerosol (SOA) particles, formed from gas-phase biogenic volatile organic compounds (BVOCs), contribute large uncertainties to the radiative forcing that is associated with aerosols in the climate system. Reactive uptake of surface-active organic oxidation products of BVOCs at the gas-aerosol interface can potentially decrease the overall aerosol surface tension and therefore influence their propensity to act as cloud condensation nuclei (CCN). Here, we synthesize and measure some climate-relevant physical properties of SOA particle constituents consisting of the isoprene

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Supplementary Information for

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GAMMA 1.4 predictions of unreacted in-particle IEPOX concentrations.

GAMMA 1.4 is based on GAMMA, the Gas-Aerosol Model for Mechanism Analysis. The full details of GAMMA 1.0 can be found in McNeill et al. (2012). GAMMA 1.4 includes the following updates:

1) Rate constant update for the aqueous reaction of the glyoxal radical with O_2: $k = 1.2e9[O_2]$ 1/s based on Herrmann (2014)