Atmos. Chem. Phys. Discuss., 5, S4766–S4768, 2005
www.atmos-chem-phys.org/acpd/5/S4766/
European Geosciences Union


Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Isoprene oxidation products are a significant atmospheric aerosol component" *by* S. N. Matsunaga et al.

**S. N. Matsunaga et al.**

Received and published: 27 December 2005

Thank you for your comments.

I agree with the reviewer at the point that this paper should have more description about the measurement technique, modeling and estimate of uncertainties in detail.

Response to specific comments

(1) The paper about annular denuder sampling system for semi volatile carbonyls is still in preparation. However, we have already had data for the collection efficiency of the denuder tube that has been obtained in the experimental forest where the samples were collected (Duke Forest during the CELTIC campaign). Collection efficiency has been tested for 4, 8 and 12 hours sampling for 3 days. Diurnal variation of the efficiency

was also obtained. The data indicated that the collection efficiency is more than 90% under 4 hours sampling and that the denuder tube is not saturated during sampling up to 4 hours. This test has been conducted at the same site as the samples described in the paper have been collected under same condition, therefore, the data for the collection efficiency must be very reliable. Although we had been planning to present this data in another paper which describes about the sampling technique in detail, according to the reviewer, we will add descriptions based on the collection efficiency data at the site in this paper.

(2) Because we can directly obtain the APR from field measurement using the sampling technique, and because we only need to know how much of the compounds are existing in aerosol phase, we thought we do not need to calculate the equilibrium constant Kp at this time. This is also the reason why we did not mention about aerosol mass. However, the gas aerosol partition of these semi volatile compounds should be predicted more accurately related with other physical values such as aerosol mass, number concentration and temperature in future work.

(3) As mentioned in (2), we agree with the reviewer at the point that there is parameter missing. Also mentioned response to Reviewer #1 and Kroll et al., we had tried to find a relationship of the APR with temperature and aerosol number concentration in previous experiment (Matsunaga et al., 2004, JGR). However, we could not find significant relationship other than the APR and relative humidity. Although the scattering in the relationship between the APR and relative humidity makes relatively large uncertainty, however, the largest uncertainty is caused by the estimate of NOx, ozone and isoprene concentration by the MOZART, this makes 200% of uncertainty. The uncertainly of the aerosol partition should be reduced in future work. However, regarding current common procedure for estimate of the aerosol partition in most study is based on very uncertain assumption and is regarded as a constant in a global scale, this study estimates the partition based on real field experiment. We believe our estimate is better and more reliable than that of previous study although there is relatively large



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uncertainty.

(4) We will add detailed information about the estimate of Y and error on the estimate as possible.

We will modify the paper according to all of Additional Comments by the reviewer #3.

Sou Matsunaga

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Interactive comment on Atmos. Chem. Phys. Discuss., 5, 11143, 2005.