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

Anonymous Referee #2

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The manuscript describes field measurements of several isoprene oxidation products in the gas and particle phase as well as modeling results estimating global aerosol particle mass resulting from isoprene oxidation. Several experimental aspects need to be clarified. In addition, the data interpretation needs a much more detailed discussion as outlined below. These points should be considered before publication of this manuscript.

The introduction section is too short. Other recent laboratory and field studies investigating isoprene as possible precursor for secondary organic aerosol should be shortly discussed. p. 11144, line 23: One of the most crucial points for the data interpretation is the collection efficiency of the denuders. In Matsunaga et al., 2004, it is mentioned

that the efficiency is >90%. Specific numbers of the collection efficiency for the three compounds investigated here should be given. A significant fraction of the P/(G+P)-values are <20%, as shown in Figure 3. If the collection efficiency of the denuder is close to 90%, a major part of the apparent particulate fraction of GA, HA and MG could actually be break-through of the denuder. This experimental aspect should be discussed in more detail. p. 11146, line 22: From the comparison of measurements and model calculations it is concluded that the model accurately reproduces the diurnal variations of MACR and MVK. This conclusion seems a bit vague because only about 12 hrs of measurements are shown and especially in the morning hours the model seems to largely under-predict the measured values. Discrepancies of measurement and model should be discussed in more detail. p. 11147, line 1 ff: Modeled and measured values of GA, HA and MG are compared. The possible reason for the observed differences should be discussed in more detail. E.g., why should the deposition rates for GA and HA be higher than for MG? Which compounds could be additional precursors for MG? Could the sinks for MG be smaller than assumed in the model? p. 11147, line 16. Instead of APR the term Kp should be used to describe "gas/particle partitioning coefficient". p. 11147, line 17: The APR was found to be RH dependent. Is it possible that the denuder collection efficiency varies with RH? This should be investigated. p. 11148, line 9 ff: The correlations derived from the data shown in Figure 3 are quite weak. Errors of the slope of the correlations should be given (i.e. are the linear correlation statistically relevant?) The scatter in the data shown in Figure 3 is quite large. Thus, other parameters seem to be mainly responsible for the concentration changes of GA, HA and MG. This should be discussed. p. 11148, line 15: How were the errors estimated? Please describe the mathematical model. p. 11148, line 18: Which errors were included in the AMC calculation resulting in the range given in Table 1? p. 11148, line 23: Please describe shortly which "controlling variables" were used in the model. p. 11149, line 1: Yields for GA, HA and MG were found to vary in the model with NOx, and O3. Were these results also observed in the field measurements? p. 11150, line 1: Assumed errors for the AMC's are 230-250%. Are the errors

ACPD

5, S4587–S4589, 2005

Interactive Comment

of the regression in Figure 3 included in this calculation? p. 11150, line 15: How was the isoprene flux determined for the model calculations in this study. Was the isoprene flux varied? If yes, what were the assumptions?

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