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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A review of Secondary Organic Aerosol (SOA) formation from isoprene" *by* A. G. Carlton et al.

Anonymous Referee #1

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The present knowledge on the SOA potential of isoprene has been well documented. The presentation of laboratory and field measurements as well as model studies is done fair. Literature data have been combined and observed discrepancies are discussed and put into a common framework where possible as e.g. SOA yields. Recommendations for further research tend to be reasonable. There are only a few minor issues to be considered as given below.

Chapter 5.2 is not so informative and should be improved. The authors have derived the formulas for the NOx dependence but do not apply them really in their model exercise. They only look at the two extreme cases. On page 8282, line 25 it is then speculated that the low NOx situation is probably more appropriate for high isoprene emission areas. It would be much more informative to have the differences between

the high NOx and no-NOx formulas with respect to a NOx-dependent calculation. This would then show the importance of such a NOx dependent formulation. I would also prefer to give these differences relative to the total organic particulate mass and not as absolute mass differences as shown in Figure 4.

The term PM for "primary organic particulate matter" is somewhat confusing as it is traditionally used for particulate matter.

Page 8277, line 13: OH exposure might be more appropriate than OH level to discuss the extent of reaction. At a lower OH level you need just longer to have the same amount of methacrolein reacted as at higher OH concentrations. The influence of OH levels is covered in chapter 4.6.

Page 8277, lines 23-24: The organic aerosol level does not lead to data scatter per se. The SOA yield depends on aerosol loading on physical grounds which is known and reported. However, the NOx level and the OH level and exposure lead to data scatter at a given aerosol loading. All three parameters are not or hardly reported and thus contribute to data scatter if not considered properly.

Page8278, line27: Care should be taken with the terms "high NOx and low NOx". According to the definition given by Kleinman low NOx covers the range when both reactions NO+RO2 and RO2+HO2 occur. What is done here is taking the limit of this range, the no-NOx situation, when only the reaction RO2+HO2 occurs.

Technical corrections

Page 8263, line 19: Volkamer 2009 not 2008?

Page 8271, lines 5, 21: Paulot et al., 2009 not 2008

Page 8273, line 17: replace occurs by occur

Page 8280, lines 7, 24, 26, 27: Put parenthesis only around the year.

Page 8281, line 3: sentence not correct

Page 8285, line11: correct “is a critical”

Page 8288, line 25: replace dicarboyls by dicarbonyls

Page 8291, line 25: replace Oh by OH

Page 8293, line 1: replace Co by CO

Table 2: what is the meaning of MW and H?

Figure 4: Units on x, y axes? I would prefer differences given relative to total organic particulate mass. Is this an average over the entire troposphere or just boundary layer?

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 8261, 2009.