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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Formation of anthropogenic secondary organic aerosol (SOA) and its influence on biogenic SOA properties" *by* E. U. Emanuelsson et al.

Anonymous Referee #1

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The paper represents interesting and relevant data set on the relationship of yield and organic aerosol mass loading and further on the anthropogenic contribution to the mixed SOA. The study also shows that the increasing fraction of ASOA in the mixed particles decreased the volatility of the particles. This seems to be related to the increasing O/C ratio of the particles which resulted from the elevated OH exposure that was needed to produce ASOA. Authors also report, not so surprisingly, the overall clear correlation with increasing O/C and decreasing volatility.

All in all, the experimental methods used in the study are scientifically sound, as well as the data processing. The paper is well written and structured, and represent impressive

amount of data, which also makes the paper a bit difficult to follow at some places. I have only a few minor comments that authors should take into account.

1) Table 1: it would help the reader if the corresponding values for BSOAs would be added to the table.

2) Experimental procedure seems to be such that in each case where AVOCs were first injected into the chamber the sunlight exposure took place right in the beginning of the experiment. If the experiments started with BVOC injection, the situation was different: the sunlight exposure took place after the beginning of the experiment. Is there some reason for this "pattern"? If there is, authors should tell it to the readers.

3) I'd like the authors to comment the possible artifacts related to the filter sampling. Was the sampling time short enough to prevent the possible evaporation of high vapor pressure compounds?

4) What are the uncertainties of the AMS measurements and O/C ratios? All in all, error bars to the figures 3, 5, and 6 should be added.

5) Authors only analyse the O/C ratio of the particle by HR-TOF-AMS and omit other more detailed methods. From AMS data it is possible to learn a great deal about the products that form during the oxidation. It is a bit disappointing to see so little effort given here in this manuscript.

7) The results based on the model calculations are multiplied by the correction factor of 1.4 (page 9). The correction factor is defined based on two different experiments. Authors should estimate how reliable is the derived correction factor and give some reasons for this discrepancy.

8) There is far too much data presented in one plot in figures 3 a and b. It would be much easier to follow the story if the data was presented in a clearer manner.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 20311, 2012.