

Interactive comment on “A mass spectrometric study of secondary organic aerosols formed from the photooxidation of anthropogenic and biogenic precursors in a reaction chamber” by M. R. Alfarra et al.

Anonymous Referee #1

Received and published: 2 October 2006

General Comments:

The paper by R. Alfarra et al. presents a study of mass spectrometric signatures of SOA formed from photooxidation of 1,3,5-trimethylbenzene and α -pinene. During the course of a typical experiment the main features of the mass spectra are maintained, still some of the minor peaks show significant changes over time. The identity of specific mass peaks is discussed together with a comparison of the chamber derived mass spectra with some organic mass spectra obtained in various field studies. The paper is well written and should be published after some minor changes.

Specific comments:

Page 7756, line 7: the different experiments conducted for 1,3,5-TMB and α -pinene have resulted in similar mass spectra. Since the authors do compare mass spectral changes later on and show a correlation (fig.4) analysis it would be highly desirable to give a comparison of the different mass spectra with same precursors in the same manner. This would ease the estimate of the variability of peak abundances observed.

Page 7757, line15 and following: The authors argue that it is difficult to account for the different contributions to m/z 18 concluding they should best set m/z 18 from the SOA equal to m/z 44. Since m/z 44 also has a considerable contribution from gas phase CO₂ it is not straight forward to understand why a gas phase water contribution is more difficult to account for. One would not expect sulphate to contribute to the signal observed at m/z 18 unless there are significant contaminations in the chamber setup. The authors should try to account for the gas phase water signal. In one example they could give the raw signal at m/z 18 together with the derived organic signal at m/z 1 8 to further justify their assumption of the peak intensity at m/z 18 being equal to m/z 44.

Page 7759, line12: The ratio of total volume concentration measured by SMPS and the mass concentration measured by AMS is said to be constant during the experiments. It would be interesting to give numbers for this ratio here, these could also support the determinations of effective densities later on in the manuscript.

Page 7762, line 26: In view of the organic precursors for the SOA and deviations from typical ratios observed for NO_x/NO₂⁺ for inorganic nitrate salts, possible other identities for the mass peaks at m/z 30 and m/z 46 should at least be mentioned.

Page 7766, line 17: Please give error bars for the effective densities.

Technical corrections:

Reference Paulsen et al. 2006 has been published in the meantime, please update

Page 7753, line 21: ...purified air and for at leas... the “and” can be removed

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Page 7761, line 17 and figure5: the m/z 59 should be labelled in the corresponding panel of the figure.

References: Allan et al., Quantitative sampling...1... add a to 2003 in reference

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 7747, 2006.

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6, S3481–S3483, 2006

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