

***Interactive comment on* “The effect of temperature and water on secondary organic aerosol formation from ozonolysis of limonene,  $\Delta^3$ -carene and  $\alpha$ -pinene” by Å. M. Jonsson et al.**

**Anonymous Referee #1**

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This paper addresses an important issue in SOA formation from biogenic compounds, that being its dependence on temperature and relative humidity, two important atmospheric parameters. To date, there is limited experimental data available related to SOA temperature dependence although partitioning theory is generally blindly applied in atmospheric models. The authors have taken an experimental approach to address these dependences following the ozonolysis of three of the more abundance monoterpenes found in the atmosphere. This work contains useful information and will get the attention from research groups studying biogenic secondary organic aerosol formation.

The authors have taken a step in the right direction but have fallen short of the lofty

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goal of developing a comprehensive evaluation of SOA dependence on temperature and RH. The writing of the paper is okay in most places but the discussion is vague and the phrasing not technically correct at times, although the authors meaning is apparent. This weakness could be corrected with some technical edits. However, the largest deficiency with the presentation is that the interpretation of the experimental observations is extremely difficult to follow. The discussion rambles and the authors fail to make clear points. This is mostly due to the fact that the paper is almost exclusively limited to qualitative observations and the interpretation of the experimental data is very speculative. Basically, I did not get any meaningful information from the text that I couldn't get from figures 1 - 3.

If this paper is to be published in ACP, I recommend that the Results and Discussion first be re-written.

A few minor points: The abstract does not clearly present the results obtained in this study.

The abstract needs to include a comparison of the results obtained with the different organic compounds used in this study.

The concentration of the OH radical scavenger given in the abstract has no significance here and should be deleted.

Page 9326, top: What is the point of the discussion starting with "There are different.."

Page 9326, bottom: It is not clear that the authors understand that the "Odum" model can be extended to include more than two compounds. It is the fact that most of the experimental chamber data is usually not sensitive enough to warrant using more than two compounds.

Page 9327, bottom: " with uniqueness in several aspects" What are these unique qualities of the flow tube experiments, they should be included here.

Page 9328, line 19: Do you mean that the terpene concentration was constant during

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the experiment. How well do these measurements agree?

Page 9329, top: What about secondary ozone chemistry, is it important (limonene)?

Page 9329, line 13: Conveyed, what do you mean by this?

Page 9329: What instrumentation was used to measure the particle concentration and size distribution?

Page 9332, line 18-20: Why quote all these different numbers for the OH yields?

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Interactive comment on Atmos. Chem. Phys. Discuss., 8, 9323, 2008.

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8, S4470–S4472, 2008

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