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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Secondary Organic Aerosol formation from isoprene photooxidation during cloud condensation–evaporation cycles" *by* L. Brégonzio-Rozier et al.

Anonymous Referee #2

Received and published: 11 September 2015

General This is a very interesting study on sytems consisting of isoprene / NOx / light system at the CESAMe chamber which allows introduction of clouds periods and the study of their effects on gas phase concentrations of the occuring species.

I have a some comments but generally think that the paper is a very thorough study fitting perfectly to the scope of ACPD. Its content is timely and of high interest for the research community. I feel the paper can be accepted after consideration of the reviewer's comments.

Details

Introduction

I agree to the point taken by Daumit et al. Page 20564, line 12) and coupled gas phase cloud experiments are one way to shed light on these systems experimentally. It would be good to come back to this particular point in the wrap-up of the paper.

Experimental

A first small comment is: How are the oxidants in the system produced ? This is mentioned in the first paper by Bregonzio-Rozier et al (2015) and then in this manuscript on page 20567 but maybe it can be mentioned earlier in the manuscript's experimental section, please move this up. Please show how ozone and OH formation is thought to occur and which oxidant levels can be expected in the runs of this current study. That would be very important, e.g. to model the system in the future.

Page 20565, line 12: Please explain ...cloud generation with a significant lifetime". What is a "significant lifetime" ? Give reference and / or shortly discuss.

Page 20568, line 21 ff: There is the PEEK transfer lien to the PTR-MS. can you give a characterisation of this ? Is the temprature of 100 °C optimum to allow transfer for the polar compounds you want to analyse with the PTR-MS ? At best discuss this in the SI.

Results and discussion

Page 573, line 19: To these SOA mass yields: Wouldn't it make sense to scale them also with cloud occurence time ? How does SOA yield scale with cloud periodes of different duration ? A yield in the unit ug aqSOA / cloud time might be more meaningful than this simple yield. How would the LWC influence the yield and would it be desirable to implement this into a yield expression ? Are there other parameters which should be / must be considered ? It would be great to discuss this here.

Page 20574: Can these observed transfers from the gas phase be compared to any model runs ? What would be expected by (i) Henry's law and (ii) reactive uptake ?

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There is an effort to do this in Page 20574, line 25 following but I have problems to understand this paragraph. It would be nice to clarify it. Maybe you can add the outcome of just considering Henry Uptake and discuss. I have problems to see numbers for the amount taken up in the experiments and calculated. I would suggest to have a Table here, that would contribute to more clarity.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 20561, 2015.

ACPD

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