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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Secondary aerosol formation from stress-induced biogenic emissions and possible climate feedbacks" *by* Th. F. Mentel et al.

Anonymous Referee #1

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This manuscript presents new results on the biogenic volatile organic emissions and secondary organic aerosol formation by a number of European plants under various stresses. This has been investigated using a state of the art laboratory set up combining a plant chamber for BVOC emission studies with a reaction chamber for SOA formation studies.

The paper is well written and the results are innovative and of great interest for Earth System chemistry/climate studies. The abstract would benefit from some quantitative information on the findings together with an uncertainty discussion. The limitation of this paper is the restricted number of investigated experiments in terms of stress origin

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and of plant types, which is however fully justified by the difficulty in performing such experiments. This prohibits an accurate extrapolation of the presented results to global scale. This limitation has to be emphasized in the discussion of the implications of the findings in section 4.

A few additional changes could further improve the readability of this very good paper.

Section 4.1 should be broken in two sections. The first section will present the BVOC emissions and SOA formation results as deduced from the experiments presented in this study and will contain the first part of the actual section 4.1. The second section will be on the 'Implications of the finding for climate impact of BVOC/SOA' and will contain the last part of the actual section that is more speculative as is also the case of the actual section 4.2.

Overall Section 4 needs to clearly refer to the limitation of the study in representativeness due to the limited number of experiments as above mentioned.

page 7464, line 16: replace 'propose' by 'discuss'.

page 7476, lines 17-20: I will agree with this statement for present climate but insects might be different in a future climate. So some rephrasing is needed here.

page 7476, lines 27-28: several references are given. it would be good to provide some insight on the content (of interest) of these studies.

page 7477, lines 15-18: this information should come earlier in the discussion of the results.

page 7466, lines 1-2: this sentence needs a second part, which briefly mentions (here) what else is needed.

page 7466, lines 24-25: some information on NOx levels in the chamber has to be provided.

page 7466, line 11: phenolic BVOC: Guenther et al (2012) indicate toluene (that is

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an aromatic hydrocarbon but not a phenol) as one of the 15 identified stress VOCs. Please rephrase.

page 7467, lines 24-27: How the chamber was cleaned between two experiments?

page 7468, lines 21-26: Did the conditions of experiment #1 detailed here have been reproduced in the control experiment?

page 7468, last line : an extra parenthesis has to be removed.

page 7477, line 24: itself has

page 7479, line 9: Tsigaridis

page 7479: last 2 lines: Several papers before the Spracklen et al 2011 study mentioned the possible anthropogenic enhancement of biogenic SOA production (e.g. -prior 2011 and in increasing year order- Kanakidou et al J. Geophys. Res., 105,9243-9254,2000; Tsigaridis and Kanakidou, Atmos. Environ., 41, 4682–4692, 2007; Weber, R. J., et al., J. Geophys. Res., 112, D13302, doi:10.1029/2007JD008408, 2007; Clarton et al Environ. Sci. Technol. 44, 3376–3380, 2010).

Figure 6: a parenthesis is missing in the legend (SQT).

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