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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Biotic stress: a significant contributor to organic aerosol in Europe?" *by* R. Bergström et al.

Anonymous Referee #2

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The paper discusses an important issue of stress induced BVOC emission and the secondary aerosol formation. Although speculative, I feel that the paper is a valuable contribution and could be published after a few comments given below are satisfactorily addressed.

The authors assign only sesquiterpene and methyl salicylate to stress induced emissions. How about an increase in monoterpene emissions due to stress? E.g. mechanical wounding is known to increase monoterpene emissions from plants (e.g. Juuti et al., 1990). How would this affect the results?

The authors state that the stress-induced emissions are neglected in emissions models. However, as the basal emission factors (BER) used in the models are typically

derived from published results on filed emission measurements by chambers or micrometeorological methods. In most cases no indication on whether the plant was biotically stressed or not was given. So it is likely that part of these measurements, and thus the BER derived from them, actually does include stress-induced emission. This is even more likely for the emission factors derived from micrometeorological measurements, as any forest stand is likely to be under some level of biotic stress at any given time. This should be discussed in the paper.

The modeled night-time NO3 concentrations at Hyytiälä site seem very high. Rinne et al. (2012) reported the measured NO3 concentrations during summertime being below their detection limit of 1 pptv, whereas in Fig. 6 the concentration is more than order of magnitude higher. How well your model compare with measurements e.g. for other oxidants (OH, O3)? How does this affect your results?

Technical comments

The text within the Fig. 1 is very small. Could it be made a bit larger.

Could you add model-measurement correlation plots as panels in Fig. 2.

References

Juuti, S., Arey, J. & Atkinson, R., 1990: Monoterpene emission rate measurements from a Monterey pine. J. Geophys. Res., 95, 7515-7519.

Rinne, J., Markkanen, T., Ruuskanen, T. M., Petäjä, T., Keronen, P., Tang, M. J., Crowley, J. N., Rannik, Ü., and Vesala, T.: Effect of chemical degradation on fluxes of reactive compounds – a study with a stochastic Lagrangian transport model, Atmos. Chem. Phys., 12, 4843–4854, 2012.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 13603, 2014.