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Comment

Interactive comment on “Influence of relative humidity and temperature on the production of pinonaldehyde and OH radicals from the ozonolysis of α -pinene” by R. Tillmann et al.

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We thank Steven Comperolle for his elucidating comment. We agree that the consideration of weight percentage of water only may have masked a significant water mole fraction (0.2-0.3) in the presence of large organic molecules. In turn, given a matrix of large organic molecules the presence of water mole fraction between 0.2-0.3 will significantly lower the average MW of the particulate components.

Our calculations in section 3.2 refer to the direct contribution of water uptake to the SOA mass. This is small and all conclusions regarding this are valid and not touched by the comment.

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The assumption of the average MW of 180g/mol was only applied in the context of humid experiments in order to calculate the partitioning of PA at the same RH. It was not applied for dry experiments. It was also not used to explain RH dependent yields.

The measured yields at 303 K for the humid case are only slightly larger than in the dry case. This may be partly related to the effect described by the comment. However, that does not affect any mayor conclusions in the paper.

At 253 K we showed by measurement that 56% to 100% of the yield increase can be attributed to uptake of pinonaldehyde. We are not sure if Raoult's law arguments for liquid mixtures apply at 253 K, especially as the comparison with the experiments at 243 K showed that obviously all of the product molecules were already frozen out.

We agree with the thermodynamic considerations and model calculations of Steven Compernelle, Compernelle et al. 2009 and Barley et al. 2009. Please, note that these calculations contain some uncertainty (Figure 3 in Compernelle et al. 2009, Figure 4 and 7 in Barley et al. 2009). We therefore see no contradiction to our results and main conclusions, especially as we changed the composition spectrum of the partitioned product molecules in going from dry to humid conditions.

References

Barley, M., Topping, D. O., Jenkin, M. E., and McFiggans, G.: Sensitivities of the absorptive partitioning model of secondary organic aerosol formation to the inclusion of water, *Atmospheric Chemistry and Physics*, 9, 2919–2932, 2009.

Compernelle, S., Ceulemans, K., and Müller, J.-F.: Influence of non-ideality on condensation to aerosol, *Atmospheric Chemistry and Physics*, 9, 1325–1388, 2009.

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