Dear Dr. Topping,

Thank you very much for comments and your helpful suggestion on our manuscript acp-2014-445. In your Editor report you asked for the range of our calculated diffusion coefficients and we agree that these ranges were only implicitly given in the manuscript until now. Below, please find an updated Figure S3 that now exemplarily shows ranges in D(H2O) for two types of SOA: Fresh a-pinene SOA (O/C = 0.3 +/– 0.1) and aged a-pinene SOA (O/C = 0.7 +/- 0.1).

The updated caption of that figure now reads:

> *Figure S3. Estimated water diffusivity ranges for α-pinene SOA and comparison of water diffusivity in sucrose and levoglucosan matrices with experimental results by Price et al. (2014) at room temperature. D_{H2O} in levoglucosan is higher than D_{H2O} in sucrose, which is captured by the method proposed in this study. The differing curvature is a reminiscent feature of the sucrose parameterization used as a basis. Fresh α-pinene SOA (O/C = 0.3 ± 0.1, orange bands) shows higher D_{H2O} than aged a-pinene SOA (O/C = 0.7 ± 0.1, green bands). The dark bands indicate uncertainty in D_{H2O} at a fixed O/C (0.3 and 0.7, respectively) whereas the light bands indicate the entire expected range of D_{H2O} in the given O/C range (0.2—0.4 and 0.6—0.8, respectively).*

We would like to add a corresponding paragraph in the main text, appendix A5:

> *Figure S3 also shows the ranges of estimated diffusivity coefficients D_{H2O} for two types of α-pinene SOA: Fresh a-pinene SOA (O/C = 0.3, orange dashed line) and aged a-pinene SOA (O/C = 0.7, green dashed line). Dark shadings confined by dotted lines indicate the range of uncertainty at a fixed O/C, corresponding to the input uncertainties used for Figure S4. Light shadings illustrate how an uncertainty in O/C of ± 0.1 translates into uncertainty in D_{H2O} and thus accounts for the natural variability within SOA as complex mixture.*

Moreover, I would like to make an additional unrelated request for a small change in the resubmitted paper. After discussion with colleagues, we would like to change the following paragraph in appendix B2

> *The model simulations thus suggest that a different ice nucleation mechanism that does not require organic material in a glassy state was active in these experiments. Possibly, insoluble products from Naphthalene OH oxidation remained solid in the otherwise fully deliquesced particle and nucleated ice heterogeneously with lower efficiency. Such a process is not considered in the model, which does not resolve single compounds and treats Naphthalene SOA as homogeneous mixture at all times.*

To the following:

The model simulations thus suggest that solid compounds that remained in the otherwise fully deliquesced particle, possibly insoluble products from Naphthalene OH oxidation, nucleated ice heterogeneously with lower efficiency. Such insoluble products are not considered in the model.

I hope these changes satisfy your remaining concerns. Please let me know if more work needs to be done before final publication in ACP. At this point already, many thanks for the time you have spent on our manuscript, this is greatly appreciated.

Best regards,

Thomas

Attachments:

Figure S3