Atmos. Chem. Phys. Discuss., 14, C6133–C6135, 2014
www.atmos-chem-phys-discuss.net/14/C6133/2014/
© Author(s) 2014. This work is distributed under
the Creative Commons Attribute 3.0 License.

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Competition between water uptake and ice nucleation by glassy organic aerosol particles" *by* T. Berkemeier et al.

Anonymous Referee #2

Received and published: 22 August 2014

Organic aerosols are prevalent in the atmosphere, but little is known about their impact on ice nucleation. The paper presented here modeled the phase transitions of model organic aerosols representing both anthropogenic and biogenic SOA due to updrafts in clouds. The phase transitions for each organic aerosol were used to predict the ice nucleation regime the particle would be involved in (deposition, immersion, homogenous) and at which temperature and RH. The novel approach and results presented in this paper will greatly help in modeling ice nucleation due to organic aerosols in cirrus and other high altitude clouds. Future studies including other organics will be interesting and are necessary to assess the magnitude of the impact of organic aerosols on IN globally.

This paper does a good job of visualizing the competing effects of aging (increased hy-

groscopicity and increased temp of glass transition) and the concepts presented. The schematics were very helpful and informative. I recommend this paper for publication.

General Comments:

The stated temperature range where glassy aerosols would be important for ice nucleation is in the range of homogeneous ice nucleation. Therefore, how important globally do you think these organic aerosols are? There is some discussion of impacts at the end of the paper, but more discussion on this temperature range and impacts would make the paper stronger.

Do the authors have any suggestions for other types of organic aerosols that should be modeled next? Or predications for which organic aerosol types are most important for ice nucleation globally or in certain regions?

Specific Comments:

Page 16454 Lines 8-9: "low temperature and low humidity" Please specify the range of temperature and humidity or add < XX °C, < XX % RH for more clarity.

Page 16460 Lines 25-26: The definition of RHg is given, but as written it was confusing. Perhaps write "The quasi-equilibrium glass transition of the aqueous organic, RHg, is shown in grey." or similar.

Page 16461: Figure 1 and the discussion of it in the text may benefit from labeling the circles as ABCD or 1234 and referring to them in the text by the number or letter for more clarity and less wordiness in the discussion.

Page 16463: A little more discussion of the Baustian 2013 data and how it relates to the model in the text, not only in the appendix, would be beneficial to the reader.

Figure 1 caption: The specific time scale should be added either on the schematic or at the end of the last sentence in the caption, where it is mentioned.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 16451, 2014.