Atmos. Chem. Phys. Discuss.,
doi:10.5194/acp-2017-92-RC2, 2017
© Author(s) 2017. CC-BY 3.0 License.

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Uncertain Henry's Law Constants Compromise Equilibrium Partitioning Calculations of Atmospheric Oxidation Products" *by* Chen Wang et al.

Anonymous Referee #2

Received and published: 9 May 2017

This manuscript describes in detail a modeling experiment to determine the best approach to describe partitioning of organic gases (thousands of compounds tested) into the particle-phase's aqueous and organic medium. The authors employ 3 modeling approaches to describe partitioning with a focus on highly oxidized material. The authors also offer comparison and a critique of an approach currently implemented in an atmospheric model based on volatility. The authors make a compelling argument for their main thesis: "The large uncertainty in Kw/g predictions for highly functionalized organic compounds needs to be resolved to improve the quantitative treatment of SOA formation." Predicted organic aerosol amounts in atmospheric models will be highly dependent on and sensitive to the chosen partitioning parameterizations, which are

Printer-friendly version

Discussion paper

highly uncertain. The authors identify a key knowledge gap.

I recommend the paper for publication provided adequate response and revision to the comments provided below.

My biggest challenge understanding this paper was Figure 3, which I believe is the most important. Perhaps there is a way to draw in 3 dimensions to make more clear? It is confusing to have the vertical purple line "without aqueous phase" drawn in the aqueous phase. It is also confusing to just have this scenario for only the ppLFER experiments. Casual readers will not understand what the circled dots in the Figure 3c are. Why do there appear to be 'straight' lines in the dots for all models, most pronounced for 0 and 1 functional groups?

Page 4, Line 71/72: May an additional reason for the study and importance of VOC oxidation products be that in addition to their higher affinity, they have a great atmospheric abundance?

Figure 2: can the method for 'possible outlier' and 'extreme value' be explicitly stated here

Editorial: p. 7, Line 159: "value" should be "values"

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2017-92, 2017.

Printer-friendly version

Discussion paper

CC BY