

Interactive comment on “simpleGAMMA – a reduced model of secondary organic aerosol formation in the aqueous aerosol phase (aaSOA)” by J. L. Woo and V. F. McNeill

Anonymous Referee #3

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Woo et al. presents a simple version of the GAMMA model, with a main focus on aerosol uptake of IEPOX and glyoxal. This is a short paper, and the work does not present enough new knowledge, at its present form. In the GAMMA paper (McNeill et al., 2012), the authors have already identified the major contribution pathways to aaSOA formation in their model (the uptake of glyoxal and IEPOX). This work simply extracts the relevant reactions of these two pathways and produces a simplified version of GAMMA. The authors then find that this simpleGAMMA behaves very much similar to GAMMA, but with a lower computation cost. While I agree with most comments from the other two reviewers, I have a few more comments:

1. Sensitivity to aqueous OH. As one of the two reviewers pointed out, aqueous OH

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can be largely enhanced by Fenton reaction. What is the sensitivity of modeled SOA to aqueous OH?

2. Aqueous diffusion. According to Schwartz (1986), aqueous diffusion may play an important role in the aqueous system. Have this been considered in the GAMMA model?

3. Correction for ionic strength. If this is a highly concentrated aqueous solution, the aqueous kinetics should be corrected for the ionic strength. Have this been considered in this model?

It seems to make more sense if authors can include an implementation of simpleGAMMA into a 3-D model, and show some results from that. That will justify its publication in GMD. The current content seems a little bit thin, in my opinion. But I will leave this to the editor to decide.

Interactive comment on Geosci. Model Dev. Discuss., 8, 463, 2015.

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