Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2019-331-SC1, 2019

Atmospheric Chemistry and Physics Discussions

Interactive comment on "An evaluation of global organic aerosol schemes using airborne observations" *by* Sidhant J. Pai et al.

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Received and published: 1 July 2019

I have several questions for this paper and would appreciate the response from the authors.

Line 126-132 and Line 152-155: It seems to me that 'OCPI' in Simple SOA scheme and 'OPOA' in Complex SOA scheme are both called as "OPOA" in this paper. Because OCPI represents non-volatile hydrophilic OC and OPOA represents semivolatile products of SVOC oxidation, they are very different. It might be better not to confuse readers about that.

Line 155-159: OPOA seemed being classified as POA in this paper. However, in Pye et al. [2010] and related field and lab studies, OPOA is regarded as SOA. Please clarify.

Line 210-212: Large differences between the two schemes in Figure 2 occur in highly polluted areas like China and India. The northeastern US show similar differences. Is it possible to use surface measurements from, for example, the IMPROVE datasets to evaluate the model performance in polluted areas?

Line 346: Why are the pristine areas in the Canadian Arctic and Greenland classified as the anthropogenic regime in Figure 5?

Line 398-399: I don't think that the consistent differences are caused by inaccurate emission inventories only. How about the lacked aging processes and the different abilities to reproduce ASOA and BSOA in the two schemes?

Line 513: I am confused that in Figure S7, the Complex POA + Simple SOA simulation shows lower OA concentrations than other combinations in the anthropogenic regime. Because the Complex POA + Simple SOA double-counts the contribution from SVOC oxidation to OA, the concentrations should be overestimated.

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