Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2020-756-RC1, 2020

Atmospheric Chemistry and Physics Discussions

Interactive comment on "A global model perturbed parameter ensemble study of secondary organic aerosol formation" *by* Kamalika Sengupta et al.

Anonymous Referee #1

Received and published: 13 September 2020

This manuscript explores the impacts of six yield parameters on particle number concentration and organic aerosol concentration based on 60 sensitivity simulations in global models. The six parameters include the yields of ELVOC/LVOC/SVOC from the oxidation of isoprene, monoterpenes, and anthropogenic VOCs. The simulated concentration of particles >3nm (N3), particles > 50nm (N50), and OA are extensively compared against measurements around the world. The manuscript discussed critical compensating parameter effects, which limit our ability to retrieve best set of parameters by comparing model and measurements. Further, it is found that parameters leading to best simulation of N3 and N50 are the worst of OA concentration, because these three attributes are driven by OVOCs with different volatilities. It is delightful to read the manuscript. The authors do a terrific job in clearly commuting and visualiz-

Printer-friendly version

Discussion paper

ing the results from 60 sensitivity simulations. Overall, the manuscript has immediate impacts on the atmospheric chemistry community and nicely fits in the scope of ACP. I recommend publication after minor revision.

Comments 1. As clearly demonstrated in the manuscript, it is challenging to retrieve best set of parameters by comparing model and measurements. To some extent, this emphasizes the importance of provide accurate parameters based on laboratory experiments. It would be great if the authors could provide some suggestions to experimentalists. 2. One clarification question: does N3 refer to particles larger or smaller than 3nm? If it is larger than 3nm as defined in Page 4 Line 20, is N50 part of N3? 3. Page 14 Line 24. Based on the index in figure 4, simulation 9 should be subplot (4,3), instead of subplot (3,4). 4. Figures 4-6. I wonder if it is better to organize the subplots in the same order as figure 2, which will facilitate locating the simulations that are discussed in the manuscript. Just a thought. 5. Figure 7. It is “Q2” in the caption, but “IQR” in the legend. Please be consistent. Also, “N3” is mentioned in the caption, but not included in the figure. Please add N3 plots to the figure to provide a complete picture. 6. Please elaborate the discussions in section 3.2, as it is not straightforward how to read figures 10-12.

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-756, 2020.

Printer-friendly version

Discussion paper