

Interactive comment on “Constraining nucleation, condensation, and chemistry in oxidation flow reactors using size-distribution measurements and aerosol microphysical modelling” by Anna L. Hodshire et al.

Anonymous Referee #1

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The manuscript ‘Constraining nucleation, condensation, and chemistry in oxidation flow reactors using size-distribution measurements and aerosol microphysical modelling’ by Anna Hodshire and co-workers presents a very detailed description of chemical and physical properties and processes which have to be taken into account when modelling the size distribution evolution of ambient air after applying an oxidation flow reactor. The authors apply data from two intensive and well known field campaigns (GoAmazon2014/15 and BEACHON-RoMBAS) in the TwO-Moment Aerosol Sectional microphysics zero-dimensional model TOMAS. The description of the applied setup and the

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uncertainties in several processes are well discussed. However, this is a very complex topic with significant impact for further research as OFRs applications in aerosol research increased in the last years. The main outcome of the manuscript is an overview about the probability of 5 selected microphysical processes which are crucial for the evolution of the size distribution under oxidative aging in the OFRs.

Personally I have to say that it was a pleasure and also very interesting to go through all the discussions on the different processes which were well provided with an adequate literature study. The authors also pointed clear out which processes were not considered and why and discussed the weakness of OFRs - so no need to discuss this further here in the review. The authors (and I believe this is more related to the first-author) performed a very large number of simulations on the topic and analysed the outcomes in a sufficient manner. They also mentioned and explained why several processes could not be considered and taking the already immense amount of performed simulations into account it is acceptable that this would be out of the frame of this work but was considered for future studies. I would see the work by Hodshire and co-workers as an important starting point on this topic and the paper will serve many other scientists as a look-up table in their future research. I have only some minor comments to the manuscript and would otherwise recommend that this paper gets published in ACP in the way it is without additional scientific improvements.

Minor comments for consideration:

Page 9 line 10-25: This paragraph is very difficult to understand and also I was reading it 3 times I still don't get all the values correct. So please rewrite it and I would also suggest to make it more clear in a table.

Page 15 line 18: ... factors explore ... should be ... factors explored ...

Page 25 line 30: ... assumed decreased ... should be ... assumed decrease ...

Page 50 line 8: The word "orange lines" should be replaced by blue lines in the text or

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they should be changed to orange in the picture. And consequently this should then be done on page 19 line 28.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-223>, 2018.

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