

# ***Interactive comment on* “Simulation of the chemical evolution of biomass burning organic aerosol” by Georgia N. Theodoritsi and Spyros N. Pandis**

## **Anonymous Referee #1**

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This paper describes simulations using the PMCAMx chemical transport model of concentrations of organic aerosol (OA) over Europe for a wintertime period and a summertime period, with the simulated OA concentration fields subdivided according to biomass burning POA, fossil POA, and SOA derived from biomass burning emissions and from other I/S-VOC. The purpose is both to simulate the biomass burning source of OA specifically, but also to be able to apply differential volatility distributions and aging characteristics for the biomass burning source compared with other OA sources. The time periods simulated include instances of very large localised biomass burning emissions, such as wildfires, and winter-time heating emissions in northern Europe.

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This is a short and very clearly presented piece of work. Methodological approach and results are clearly described. I do not have any scientific/technical issue with the work. The work adds to the estimations of amount of OA from different origins for the European domain, where that estimation is sometimes derived from 'backward' source-receptor modelling of measurements or, as here, from 'forward' chemical-transport modelling from estimated emissions. Where this paper has some limitation is in 'ground truth-ing' the model simulations. The authors do provide some comparison summary statistics between their model concentrations and those derived from AMS-PMF measurements at a few sites across Europe but it can be difficult to draw conclusions from such comparisons because model and measurement data do not always represent exactly the same chemical/source entity. The authors conclude there is a potential shortcoming in emissions data for residential heating but do not undertake model sensitivities on changing the emissions.

Overall, however, I am happy to recommend this manuscript for publication as it is. I spotted only very few formatting errors:

Line 112: insert "and" before "intermediate".

Line 283: cite to Fig. 4a rather than generically to Fig. 4.

Line 302: after "on March 21" add a citation to Fig. 4b.

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Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-1166>, 2018.

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