Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC2
https://doi.org/10.5194/acp-2021-380-RC2, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

late review (apologies for that)

András Gelencsér (Referee)

Referee comment on "Technical note: Pyrolysis principles explain time-resolved organic aerosol release from biomass burning" by Mariam Fawaz et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-380-RC2, 2021

The manuscript focuses on an important issue, namely the understanding of the mechanism that releases organic aerosol particles and their precursors from biomass (wood) burning. It is an excellent piece of work, with clear research objectives, good experimental design, robust and well-supported conclusions. The set of key experimental parameters selected covers the spectrum of most real-life conditions, and may form a basis for better parameterization of emission inventory calculations, especially for forest fire emissions. I have only a few minor comments and suggestions that are given below:

Page 4 Line 96:

It is not specified (not even in Table S1) at what sampling temperature aerosol particles are measured inside the second dilution line. Temperature strongly affects particle size distribution of OA because the abundance of semi-volatile compounds. If it is near ambient, the experiments represent a sort of theoretical upper limit for the emission of OA particles into the atmosphere, because all other processes that are admittedly not considered would reduce OA emissions and increase the emission of permanent gases and soot.

Page 4 Line 103: The reported observation that "a dark, heavy, sticky, material was released in some experiments" is very valuable because it indicates that formation of tar balls, a very significant subgroup of brown carbon particles in the atmosphere. While I

understand that this compounds cannot be collected as particles due to experimental limitations, it might be very useful if their presence were indicated e.g. in Table 1 either with Yes/No or with some semi-quantitative visual classification (e.g. +, ++, +++) if they can be reconstructed from the experimental records.

Page 4 Lines 258–260: These seemingly contradicting findings may be rationalized by the potentially different chemical compositions of organic compounds released when water is present due to supplementary processes such as steam distillation. However, it seems that on a mass basis energy reduction by the presence of water predominates in all cases observed.

Further minor comments:

Page 4 Lines 112–115: Names of tree species must be written in italics

Page 6 Line 161: Typographical errors: the character En dash should be used here and the symbol × instead of *