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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Composition and light absorption of nitroaromatic compounds in organic aerosols from laboratory biomass burning" *by* Mingjie Xie et al.

Anonymous Referee #3

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General comments:

This manuscript presents an interesting study on the presence of nitrogen containing aromatic compounds and their light absorbing properties in laboratory generated biomass burning organic aerosols. I found the manuscript difficult to follow in its current form, mainly because most of important information that supports the authors' discussion is presented in supporting information (Tables S1, S2, and Figure S2). They can be moved to the main manuscript. Apart from the organization of the manuscript, I have three issues that I want the authors to address prior to the acceptance of this manuscript.

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Discussion paper

Specific major comments:

Table S1 MAC365 for 7/14/2016 sample and lines between 199 and 202
This highlights the difficulties associated with the comparison of the data obtained from laboratory combustion experiments. As the authors suggest between the lines 199 and 202, the ambient condition appears to be very important for MAC365 values because the summertime combustion of NC forest 2 shows significantly higher values for MAC365 than the springtime combustion of NC forest 1. This can only mean higher absorption coefficients of the NC forest 2 samples than those of the NC forest 1 or lower methanol extractable mass concentrations of the NC forest 2 samples than those of the NC forest 1. Based on the higher ambient temperature of the NC forest 2 experiments, I assumed that this originates from the difference in gas/particle partitioning (i.e. higher gas phase concentrations of MAC365 compounds in NC forest 2 experiment) though it is not too clear to me if this is the case when I see the mass fractions of MAC365 products depicted in Figure 1 and Table S4. From Figure 2 and Table S6, it can also deduce that the samples from NC forest 2 combustion contained highly light absorbing compounds that are not detected in this study. Can the authors elaborate more in the manuscript? As is now, it is not too clear to me why the MAC365 values are so different when other parameters are relatively similar.

Line 215: Is there a reason for the choice of 1.7 OM/OC factor? In the original paper of Turpin and Lim (2001), 1.7 was not mentioned as a conversion factor for biomass burning organic aerosol. Values for fireplace combustion cited in Turpin and Lim (2001) were between 1.9 and 2.1 that were determined by Schauer (1998). In addition, there are several more recent values available in the literature.

Identification of the benzisoxazole skeleton
It is not clear to me why the authors attributed the loss of CNO as the presence of the benzisoxazole skeleton instead of e.g. isocyanates for C9H9NO4 compounds. By los-

ing CNO (actually HCNO) from the benzisoxazole skeleton, one forms highly unstable biradical product ions that aren't likely detected in MS. Can the authors shed light on how the fragments are formed in the revised manuscript?

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