Atmospheric
Chemistry
and Physics
Discussions

ACPD

Interactive
comment

Interactive comment on "The characteristics of atmospheric brown carbon in Xi'an, inland China: sources, size distributions and optical properties" *by* Can Wu et al.

Anonymous Referee #2

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This paper reports on the light absorption of organic aerosol components (BrC) in an urban setting with significant biomass burning emissions in China. Both the experimental methods and the data analyses approaches are largely identical to other studies and are not novel. This paper's contribution is that it adds more data points to the characterization of BrC in various locations. Possibly the most interesting finding is strong evidence for the secondary formation of BrC in summer. Overall I have only minor comments, with the exception that 1) the authors could do a better job of citing original sources, and 2) the paper could use some editing throughout. The paper is appropriate for ACP and in my view acceptable after consideration of the following issues.

Discussion paper

Specific comments

Line 160 to 161. In calculating the MAC what is the concentration of the the carbon? That is, clarify what is the WSOC and MSOC concentration. I assume they are mass of carbon per volume of air, not per volume of liquid extract. Also, what about conversion of carbon mass to organic aerosol mass. Finally, it seems that since this is all liquid based analysis, can this data be applied to atmospheric aerosols? If the authors think so, justify how this is done (see the comment below on the 1.3 factor, this should be noted here in the text).

It would clarify things if the authors used the units of ugC/m3 for WSOC and OC throughout, instead of ug/m3.

Line 198 and beyond. The use of the term matters is a poor choice. Eg, edit . . . as ubiquitous matters in the atmosphere. Also in a few lines down the term matters is again used.

Edit line 201, due to owning. . .?

Line 314 to 317. The value of Mei-predicted (based on size resolved data) and bulk light absorption factor of 1.3 is interesting. Since this work is simply repeating what other studies have done, please compare this 1.3 factor to the factor reported in these other studies (these papers are already cited). Also, the statement that using liquid based Abs or MACs to estimate aerosol optical effects will result in an underestimation is obvious and not new. It seems more important that the authors should state that in this study, to convert the liquid based data reported here to estimated aerosol properties, a factor of 1.3 must be applied, at least for the water-soluble data.

In Figure 5, explain the regular up and down pattern in PAHs, OPAHs and nitrophenols. The pattern also seems to be evident in some other plotted factors, such as Abs. . . This looks like a measurement artifact and not real. Please provide some evidence it is real or possible explanation for the cause.

Line 346, or at least the bleaching was offset by SOA BrC formation.

Line 350, why is the term mass absorption efficiency used here where earlier the MAC was discussed. What is the difference?

I suggest throughout the paper the authors do not give % fraction of the various sources to one decimal place, the precision is not that high (ie, convert 16.2% to 16%, etc).

Edit line 411-412

C3