Title: Brown carbon's emission factors and optical characteristics in household biomass burning: Developing a novel algorithm for estimating the contribution of brown carbon

This is a manuscript that reports on the emission factors and optical characteristics of BB-derived BrC and development of a novel algorithm for estimating the contribution of BrC. The results indicated the mean emission factors of BB-BrC are 0.71 g/kg, which were affected by the plant type and burning styles. The average AAE value was 2.46 ± 0.53, which are much higher than that of coal-chunks combustion smoke. The contribution of absorption by BB-BrC to the total absorption by BC + BrC were also calculated, is 50.8%. Finally, a novel algorithm was developed for estimating the F_{BrC} for any combustion sources. This is an interesting research about the emission factors and light-absorption characteristics of BrC emitted from biomass burning. I think the manuscript can be accepted after the following comments are addressed.

Comments:

1) Line 11: what's the meaning of "0.24, 2.18"?
2) Lines 70-76: several important references for the BrC from biomass burning in China were missed, such as Fan et al. (2016) ACP, 16, 13321-13340; Huo et al. (2018) Atmos. Environ., 191, 490-499, etc.
3) Experimental section: accuracy, precision, and repeatability are not well quantified or discussed in this paper. The 11 biomass fuels are each burned and sampled once. The filter sample for each fire is collected in background air, so ambient aerosol may present in the sample. These may be reasonable experimental procedures, but the following information is missing: i) Blank filter sample for ambient air only to determine the background concentrations; ii) Repetitions of identical sample burns to determine the repeatability of the fires and the analysis procedure.
4) Please reduce the number of significant digits (2-3 is preferred) in Table 1, S1,

and possibly in the main text. For example, “7.259” (four significant digits) can be present as “7.26” (maximum three significant digits). Please double check such errors throughout the entire manuscript.

5) Lines 205-208: The ratios of EF_{BrC} to EF_{BC} for different samples were varied with very large range (the highest one is 10.0 and the lowest one is 1.5). Why? Please add some explanation. This is very important for the estimation of the contribution of BB BrC.
6) Figure 2: the data of BrC from BB and coal combustion should be label with different markers.
7) Lines 252-258: China’s BrC and BC emissions from biomass fuels burned in household stoves were calculated. This section is associated with high uncertainties due to the reliable consumption amounts of different types of biomass fuels and forms, representative BrC emission factors from this study. I’d like to suggest to add discussions on uncertainties and limitations.
8) Section 3.4, Lines 295-306: To construct the function for F_{BrC}, with AAE as the independent variable, four pairs of F_{BrC} vs AAE values were investigated: one pure BC and three pure BrC. For the three pure BrC, I have two questions: 1) why the average values of F_{BrC} vs AAE rather than the data of each sample were used to construct the function between F_{BrC} and AAE? 2) As shown in Table S3, the AAE values of WSOC or MSOC in the literature were determined in solution. However the AAE values of BrC were determined with the integrating sphere method in this paper and the previous study (Sun et al., 2017). How about the differences of AAE values measured with these two methods. You should add some discussions to interpret that.
9) Table S1: The abbreviation of “M%, CR, FW, PF” should be illustrated in full name.
10) Is Fig S4 cited from the literature of authors (Sun, J., Zhi, G., et al., Emission factors and light absorption properties of brown carbon from household coal combustion in China, Atmos. Chem. Phys., 17, 4769-4780)? If so, please add references in the caption.