

Interactive comment on “Characterization of the light absorbing properties, chromophores composition and sources of brown carbon aerosol in Xi’an, Northwest China” by Wei Yuan et al.

Anonymous Referee #2

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In this work, the authors investigated the optical properties, chemical composition and sources of brown carbon (BrC) in Xi’an from 2015-2016. They identified three groups of BrC chromophores including PAHs and their derivatives, nitrophenols and methoxyphenols, of which some were not identified as BrC chromophores in previous studies (e.g., methoxyphenols). The authors then quantified the contribution of these identified chromophores to the total light absorption of BrC at the wavelength from 300-500 nm, which is important dataset because the link between BrC absorption and chemical composition is a key for estimating the effect of BrC on radiative forcing but such data are still very limited particularly for ambient measurements. Finally, the authors quantified the sources of BrC by PMF using these identified chromophores and found the seasonal

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difference in the contributing sources. In general, the results are provided in a concise format and the discussion is well stated and directly related to the important aspects of BrC, i.e., the links between optical properties, chromophore composition, and sources of BrC. Also, the paper is well written and organized. I recommend publication in ACP after minor revision.

Specific comments

1. The peak values of the light absorption contribution of the measured chromophores are not always at 365 nm. Therefore, it could be better to include the average light absorption contribution of these chromophores to BrC at the wavelength of 300-500 nm.
2. Previous studies often discussed the light-absorption contribution of chromophores to water-soluble BrC. The authors discussed only the contribution to methanol-soluble BrC in this study. Should they also discuss the contribution to water-soluble BrC from the identified chromophores?
3. Page 6, line 162. Change “9,10-anthracenequinone (9,10-AQ)” to “9,10-anthracenequinone (9,10 AQ)”.
4. Page 6, line 163-166. Not all species are non-light absorbing. For example, picene contains five benzene rings and should be light-absorbing species. It could be better to change “non-light absorbing markers” to “commonly used markers”.
5. Page 11, line 300-301. 9,10 AQ, BEN and BbF11O are not only from combustion emission but also from secondary formation. Please clarify it.
6. Page 26. Figure 2. Change $m_2 \text{ g}^{-1}$ to $m_2 \text{ gC}^{-1}$.

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