

## Comment on acp-2022-465

Anonymous Referee #2

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Referee comment on "Chromophores and chemical composition of brown carbon characterized at an urban kerbside by excitation–emission spectroscopy and mass spectrometry" by Feng Jiang et al., Atmos. Chem. Phys. Discuss.,  
<https://doi.org/10.5194/acp-2022-465-RC2>, 2022

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Jiang et al., present a study on exploring the optical and chemical composition of brown carbon. Comparing with previous studies, this study combines the optical measurements and chemical measurements (AMS and Fi) and can obtain more information on the sources and chemical processes of chromophores. They found LO-HULIS chromophore was primary with nitrogen-containing molecular and originated from biomass burning at the urban kerbside during winter. However, HO-HULIS chromophores were secondary and could be related with photochemistry during summer. Overall, the results and presentation are reasonable and clear. However, there are many minor issues in the manuscript which should be addressed before publication.

### Major issues

Since the major focus of this manuscript is on BrC and filter measurement, the 2.2 and 3.1 sections could be concise and merged into other section or cited from other parallel publication. In method section, it is also important to describe the data matching between online and offline data.

The samples described in the method section are unclear. How many filter samples was collected during winter and season, how many samples were collected for one day, morning time or nighttime? What material filter was used? What is the instrument? What is the filter sampling strategy for CIMS analysis? This information should be clearly presented in method section.

## Minor issues

- Line 23-24: present the full name of AMS and more information on the measurement and results (online or offline? How many factors were obtained). In the above, the PARAFAC analysis has present and directly use PARAFAC results.
- Line 197-210: The results of PARAFAC on winter and summer season are significant different. Is this seasonal process conducted at a combined dataset or separated? It is better to input the combine dataset into the model.
- Line 260-263: it is worth to mention the wavelength range of AAE in different studies which can significant influent AAE result.
- Line 272-274: this information is already in method section.
- lines 287-288, Change to “shorter excitation wavelength (< 250 nm) and shorter emission wavelength (< 350 nm)”.
- line 289, Change “left” to “right”.
- Line 308-309: the abbreviation of aerosol mass spectrometer should be consistent in the main text.
- In section 3.3, the authors discussed the fluorophores only in MSOC, but the papers cited by the authors when determining the fluorescence components mostly about fluorophores in WSOC. See the previous papers where there are clear differences in the water-soluble and methanol-soluble fractions.  
<https://doi.org/10.5194/acp-20-2513-2020>
- lines 321-322, “two different types of LV-OOA were observed LV-OOA1 and LV-OOA2”, what is the difference between LV-OOA1 and LV-OOA2? The sources of C2 and C3, which are respectively associated with LOOA1 and LOOA2 are both simply classified as a less volatile oxygenated organic aerosol in this study.
- Section 3.4: It is common to definite SV-OOA and LV-OOA to LO-OOA and HO-OOA, respectively. For the elemental ratio calculation, it is better to mention the method for this calculation.
- Line 340-341: The explanation on PLS is not convinced. This factor could be primary or secondary. Phenolic compounds have similar EEM feature with this factor. In addition, is there blank filter during sampling? If it is, it can be used comparison?
- line 356, how to calculate “NFV”? NFV data shown in Figure 5c differs from other literature by several orders of magnitude; please confirm whether the normalization was done using the fluorescence volume integral value (RU-nm<sup>2</sup>).
- Line 344-355: It is better to compare the seasonal variation on chemical and chromophore composition using the consistent filter samples. Since some filter samples were collected only during a few hours, these filter should be removed during seasonal comparation. The chemical processing on particulate and gas phase is complicated and cannot be got the conclusion for LO-HULIS and O<sub>3</sub> only based on the correlation analysis.
- Line 413-415: It is not suitable to cite the result from river chemistry.
- In Figure 7, although the molecular weight are significant different in each figure, but the O/C and H/C are similar, does this right?