Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC3
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Comment on acp-2022-676

Anonymous Referee #2

Referee comment on "Technical note: Chemical composition and source identification of fluorescent components in atmospheric water-soluble brown carbon by excitation–emission matrix spectroscopy with parallel factor analysis – potential limitations and applications" by Tao Cao et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2022-676-RC3, 2022

Reviewer: In this study, EEM data of different types of strongly light-absorbing organic compounds, water-soluble organic matter (WSOM), soil dust, and purified xanthic and humic acids from different aerosol samples (combustion source samples and ambient aerosols) were investigated in a comprehensive manner using the EEM-parallel factor method. This work can be recommended for publication in Atmospheric Chemical and Physics after the authors address some issues as follows.

- Lines 129-130: What is the purpose of setting up soil samples? Please explain it in detail.
- Lines 134: Additional details whether the blank PM_5 sample was collected, please add this information.
- Lines 411-412: "The relatively higher C3 content in CZ could be attributed to the comparatively high contribution of soil dust in the suburban region". Please provide more evidence for the higher contribution of suburban soil dust to atmospheric PM_5
- Section 3.4. The paper also mentions that some brown carbon fractions have strong absorbance but not fluorescence characteristics, so is it reasonable to analyze the relationship between absorbance and fluorescence using Pearson correlation coefficient?
- In Introduction part, Section 3.1 and 3.3, some new references associated with WOSM molecular and chemical functional group profiles should be added to support the finding of this study, such as:

1). Light absorption properties and molecular profiles of HULIS in $PM_{2.5}$ emitted from biomass burning in traditional "Heated Kang" in Northwest China. Sci. Total Environ. 2021, 776, 146014.;

2). Seasonal and diurnal variation of $PM_{2.5}$ HULIS over Xi'an in Northwest China: Optical properties, chemical functional group, and relationship with reactive oxygen species (ROS). Atmos. Environ. 2022, 268, 118782.;

3). Optical properties, chemical functional group, and oxidative activity of different polarity levels of water-soluble organic matter in $PM_{2.5}$ from biomass and coal combustion in rural areas in Northwest China. Atmos. Environ., 2022, 283.

4) Optical properties, molecular characterizations, and oxidative potentials of different polarity levels of water-soluble organic matters in winter PM2.5 in six China's megacities. Science of The Total Environment, 2022, 853: 158600

- Line 451: The conclusion of this part is not prominent enough, suggesting a more in-depth analysis and better conclusions.
- Figure 3 was lost the legend, please redraw this figure.
- Please add the necessary comments for Figure 4, what does each line represent?
- The language overall is acceptable, except for a few places which fail to meet the required level, advice on Grammar from a native writer of English would be helpful.