

Atmos. Chem. Phys. Discuss., referee comment RC2
<https://doi.org/10.5194/acp-2021-465-RC2>, 2021
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Comment on acp-2021-465

Anonymous Referee #2

Referee comment on "Measurement report: Particle-size-dependent fluorescence properties of water-soluble organic compounds (WSOCs) and their atmospheric implications for the aging of WSOCs" by Juanjuan Qin et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-465-RC2>, 2021

Comments: In the present research, an informative excitation-emission matrix (EEM) of fluorescence method is applied to estimate the fluorescence properties of water-soluble organic compounds (WSOC) for different particle sizes, in a rural site of Beijing, China. The light absorption properties of WSOC and its significance on secondary transformation of aerosol has been long researched. A sort of data analysis methods is combined to investigate the fluorescence properties of size-segregated WSOC, and the possible aging processes of WSOC with particle size increase is unveiled. This research is well arranged indeed. However, there are still some questions that need to be further modified. I hope that after the author has carefully improved the manuscript, it is recommended to publish it to Atmospheric Chemistry and Physics.

Special comments

- Line 93: It seems unnecessary to have another repeated "were" at the end of this line.
- Line 101: It should be "adapted" rather than "adopted".
- Line 115 to 116: Are these parameters for EEM sampling? Please make it clear what are they refers to.
- Line 155: A verb is missing after "ξ"
- Line 181-185: The sentences of this paragraph are hard to read because of lacking main logic board. Try to describe the seasonality and the size distribution of SFI separately, rather than mixing them together.
- Line 196-200: Line 196 to line 198 were mainly about the size distributions of FRI \hat{a} to \hat{a} \times , however, the description of "FRI \hat{a} ϕ and FRI \hat{a} \times (HULIS) were the most abundant two fluorophores rich in fine particles." Seems incongruent with the context. Moreover,

what is the purpose of adding the reference of Huang et al., (2020) found similar size distribution of protein and HULIS by isotopic method at the end of this paragraph?

- Line 243-246: Similar to former issue, the sentences were uncombined with each other. So the intention of each description is confused. Why do you propose a HULIS1/HULIS2 ratio for winter results? If HULIS1 (or 2) implies different oxidation state of HULIS, the last sentence should be brought forward.
- Section 3.5: If it is just as my comprehension, the GRD is a factor of reflecting relations between two factors, why does the author use grey relational analysis rather than correlation analysis?
- Line 191: The author state that "Our unpublished research found that the AFI/WSOC ratios were lower than 0.2 for anthropogenic source samples, indicating that this ratio might be higher in oxidized fluorescent WSOC." This "indicating" may not be easily deduced here, and I noticed that these inductions are discussed in line 282 to line 292, so the description in line 191 can be saving for later paragraph.
- Line 293: The first sentence shows weak leadership for this paragraph, it also shows little connections with later context
- Line 315 to 318: The conjectured sources of HULIS is not closely related to former context.

Minor issues:

- The tense form should be unified
- Check the abbreviations and capitalized letter throughout the article, some of them are in wrong form.
- Some of definite or indefinite articles are missing.