

Comment on acp-2021-1045

Anonymous Referee #1

Referee comment on "Measurement report: Optical properties and sources of water-soluble brown carbon in Tianjin, North China – insights from organic molecular compositions" by Junjun Deng et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-1045-RC1>, 2022

This manuscript investigated the optical properties, sources and radiative impacts of water-soluble brown carbon in Tianjin, a representative megacity in the North China Plain. Daytime and nighttime samples were collected during winter and summer, and analyzed for aerosol compositions, light absorption spectra and fluorescence properties. Based on the measurement results, connections between the chemical compositions and optical characteristics of aerosols were explored; in addition, radiative impacts of brown carbon were estimated using different approaches. My overall assessment is that this manuscript could be considered for publication as a Measurement Report after a minor revision. My detailed comments are given below.

Line 16. Suggest change "aerosols" to "particles".

Lines 19-20. Check this sentence.

Line 21. I guess something was missing after "44.6 ± 13.9 %", e.g., were the two values for different seasons?

Line 45. It should be "On one hand".

Line 48. Secondary BrC could also be formed through gas-phase (i.e., photochemical) reactions.

Section 2.1 The number of samples should be clarified. This information is important for the reliability of the PMF results.

Lines 107-108. Details on the EC-tracer method should be provided, e.g., determination of the OC/EC ratio representative of primary emissions.

Line 133 and elsewhere in the manuscript. Check the unit of MAE (m²/g or m²/gC).

Equation (4). Check whether the WSOC mass has been converted to that of water-soluble organic matter.

Lines 197-199. Was the difference in AAE statistically significant?

Lines 240-243. Were these values calculated by the same methodology?

Line 315 and elsewhere in the manuscript. Maybe it is better to use "r" (in italic) instead of "R".

Lines 403-404. Check the units of levoglucosan.

Section 3.5. I would like to see the relationship between SOC estimated by the EC-tracer method and that derived from PMF analysis.

