

General comments

This manuscript compared carbonaceous aerosol data measured by different sampling and analytical approaches, based on field campaigns (winter and spring) performed at an urban site in Northeast China. Major contributions included that the effects of methanol extraction on EC measurement were clearly explained, and the EC and OC results that were most indicative of aerosol sources, including secondary aerosol formation and open burning emissions, were identified. The authors also compared aerosol compositions measured by different PM_{2.5} samplers, and argued that the results were not always comparable. The methodologies and interpretations were generally reliable, and the conclusions provided implications for future studies on aerosol observation and source apportionment. I agree that the manuscript is suitable to be submitted as a technical note, rather than a research article. It should be publishable if the authors could properly address the following concerns. The comments were raised during the “quick reports” stage, and are now posted for open discussion.

Specific points

(1) Line 23-25. Tone down the statement. In the abstract, it is better to say that K⁺ and brown carbon results should be compared or integrated with caution across studies using different PM_{2.5} samplers.

Our responses: The sentence was re-written as: “*We suggested that K⁺ and light absorption coefficients of brown carbon should be compared or integrated with caution across studies using different PM_{2.5} samplers*”.

(2) Lines 40-42. Clarify that the statements are for chemical transport models.

Our responses: We prefer to keep the sentence as is, since the term “model” used here is not limited to chemical transport models, e.g., it also includes dispersion models.

(3) Line 96. Re-write it as: ...efforts on the exploration of PM_{2.5} sources...

Our responses: The change was made as suggested.

(4) Line 101. Is the abbreviation necessary?

Our responses: The abbreviation “HIT” was removed.

(5) Line 108-111. The sentence is too long.

Our responses: The sentence was divided into separate ones as suggested: “*The 2021*

winter campaign covered the entirety of January, the coldest month during that year with an average temperature of -19°C . In addition, the spring campaign was conducted during 10–30 April of 2021...”.

(6) Section 2.2. To my understanding, the reason for using transmittance correction is to link EC and ATN. This point should be clearly explained.

Our responses: This point was clarified as suggested: “*This correction approach was applied since the intensity of the filter transmittance signal (I) has a clear association with EC, e.g., as assumed by the Aethalometer, another widely used instrument for measuring black carbon*”.

(7) Line 130. Add “typically” before “with a linear dependence”.

Our responses: The change was made as suggested.

(8) Line 191. Termed as?

Our responses: The mistake was corrected.

(9) Figure 2. Define “ref.” appeared in the figure.

Our responses: We defined “ref.” as suggested.

(10) Line 195. I guess “Group-R” was missing.

Our responses: The mistake was corrected.

(11) Line 213. Changing “these samples” to “the targeted samples” would make the sentence clearer.

Our responses: The change was made as suggested.

(12) Line 216. Add “typically considered” before “soluble”.

Our responses: The sentence was changed to: “*Other scattering components such as nitrate and secondary organic aerosol (SOA) were not discussed here, since they were typically considered soluble in methanol and should be absent in the extracted filters*”.

(13) Line 264. Remove “distinct”.

Our responses: The change was made as suggested.

(14) As can be seen from Figure 5b, after excluding the two highlighted samples shown by the arrows, the overestimation of BC mass by EC-untreated seemed more or less

evident for the other HV samples with high sulfate loadings. However, I agree that such overestimations could be considered insignificant, since they did not disturb the linear dependence of ATN on EC-untreated shown in Figure 5a. Thus, the following changes are required: Figure 5 caption and the main text, define the two distinct samples as outliers; Line 337, change “apparent” to “significant”; Line 376, change “considerable” to “significant”.

Our responses: The changes were made as suggested.

(15) Lines 396-398. Confirm whether all the events occurred in the spring. If some of them occurred in winter, I am afraid that it is not robust enough to attribute the events to dust.

Our responses: We confirmed that all the events were encountered in the spring. This point was clarified in the revised manuscript.

(16) Lines 400-401. The statement needs to be refined. Based on the available results, it is more proper to say the impact performances were not exactly the same for the two samplers, and some large particles were more effectively collected by one of them. Lines 413-415 and the conclusions have the same problem.

Our responses: The two sentences were re-written as: “*the impactor performances (e.g., the size-cut curves) were not exactly the same for the two samplers, such that some relatively large particles, if present, could be more effectively collected onto the HV filters compared to LV*” and “*some fire-emitted chromophores were associated with relatively large particles that would be more effectively collected onto the HV filters*”. The conclusion was updated accordingly: “*some relatively large particles, if present, could be more effectively collected by the high-volume PM_{2.5} sampler compared to the low-volume one*”.

(17) Lines 444-449. The statements were difficult to follow. Re-organize them.

Our responses: The sentences were re-written as: “*In addition to the complex sulfate-related artifacts, another problem identified for the IMPV-based EC_{extracted} was that the corresponding OC/EC ratio sometimes exhibited no association with the SNA/CO ratio, which was used as an indicator for the significance of secondary aerosol production. The NIOSH-based OC/EC ratios, determined by either EC_{extracted} or EC_{untreated}, had the same problem*”.