

Comments by referees are in blue.

Our replies are in black.

Changes to the manuscript are highlighted in red both here and in the revised manuscript.

Reply to referee #2

In this manuscript, Li et al. conduct a comprehensive examination of how agitation methods, filter pore size, and contact time influence the solubility of nine aerosol trace elements through ultrapure water batch leaching techniques utilized across various labs. The findings indicate that the impact of these variations on solubility measurements is minimal, underscoring the necessity for standardized leaching procedures and the endorsement of ultrapure water batch leaching as a baseline protocol. Given the array of leaching protocols previously employed to extract dissolved aerosol trace elements, discerning the disparities among them is crucial. Overall, the article presents its results clearly, boasts a logical structure, and is well-written. Therefore, I recommend its publication once the minor issues listed below are addressed.

Reply: We would like to recommend ref #2 for reviewing our manuscript and recommending it for publication. We have addressed his/her comments which greatly help us improve our manuscript, and revised the manuscript accordingly, as detailed below.

The authors should briefly elucidate the rationale behind the selection of the nine elements for study in the introduction or methodology section. It is important to convey to the readers the representational significance of each element, ensuring that the selection appears deliberate rather than arbitrary.

Reply: In the revised manuscript (page 7) we have added one sentence to explain why we chose these elements: “These elements were chosen because they are important nutrients, toxic elements, or source tracers.”

As the core of the article revolves around the comparison of analytical methods, the details of the methods should be more thoroughly delineated. (a) The authors mention collecting four sampling blanks and three laboratory blanks. They should elaborate on how these were utilized to correct the results and to what extent they affected the outcomes. Also, whether the analysis of blanks differs with the method should be detailed. (b) The use of ICP-MS for analysis is noted. It would be beneficial for the authors to introduce the QA/QC of ICP-MS analysis, particularly by

providing information on the Method Detection Limits (MDL). Details on the ICP-MS used at NIO, if available, should be also included.

Reply: The blank levels were very low. In the revised manuscript (page 6) we have added one sentence to provide information for our blanks: “The amounts of dissolved trace elements on blank filters were mostly below detection limits; in a few cases the blank levels exceeded detection limits, but were negligible when compared to these on filter samples.”

Information related to QA/QC and MDL can be found in original papers which described technical details. As a result, we do not repeat such information, but refer readers to relevant papers which we cite.

In Table 1, some cells are empty, which looks unprofessional. It is recommended to write 'NA' or use a dash line with a footnote for clarification. Additionally, what does 'lab' in the header signify? Is it a lab code or the location where the experiment was conducted?

Reply: In the revised manuscript (page 7) we have added one sentence in the table caption to explain what “lab” in the table means: “In this table, “Lab” represents the lab whose protocol was adopted in this work to digest or leach subsamples.” In addition, as suggested, in the revised manuscript (page 7) we have filled empty cells with “--” when applicable.

Lines 184-185: A single sentence as a paragraph is inappropriate; it should be combined with the preceding section.

Reply: This paragraph only has one sentence, because we make this intentionally to underscore this sentence; as a result, we prefer to keep it as it is.

Table 2 displays t-test results, yet the discussion suggests that even with significant differences for certain elements, the discrepancy is minor. Thus, the importance of t-test outcomes seems diminished, and it is suggested to place them in supplementary materials.

Reply: We agree that Table 2 can be moved to SI. However, as the main text itself only have 3 tables and 4 figures, we decide to keep Table 2 in the main text.

In Figure 4, panels b and c, the authors should clarify the presence of two sets of equations (one black, one blue). Is it because one set excludes outliers? If so, how were these outliers determined? This should be clearly explained. Based on Figure 4(b), the presence of outliers appears to have a minimal impact on the linearity of the data.

Reply: In response to this comment, we have added the following sentence in the figure caption in the revised manuscript (page 17) to provide necessary explanation: “Black lines

represent fitting when all the data points are included, and blue lines represent fitting when outliers (represented by red crosses) are excluded.” In addition, similar changes are implemented for figures in SI when necessary.

Minor Issues: (a) When describing the correlation coefficient, should it be capitalized as 'R' or 'r'? The manuscript uses both; please check and standardize throughout the text. (b). In Tables 1 and 2, some content is bold and underlined. While the intent to emphasize is clear, uniform formatting or an explanation in the footnote would be advisable. (c). The use of red to highlight information in the figure axis titles is unnecessary, as clarity is already achieved without it.

Reply: (a) In the revised manuscript we have changed all the “R” to “r”, as suggested by the referee.

(b) We agree with the referee, and in the revised manuscript (page 7) we have added one sentence in the table caption for necessary explanation: “**Experimental parameters for subsamples 2c-2e, when different from those for subsamples 2a, are highlighted in bold and underline.**”

(c) For these figures, x-axis is very similar to y-axis. As a result, we prefer to highlight the difference in red, as in this way readers can easily understand these figures.