

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 #3

General Comments:

This manuscript presents a comparison of trace elements measurements in aerosols using eight different leaching methods from different institutes. It is important to have good practical protocols to determine the contents or solubility of elements. The manuscript found significant variations among the leaching methods in determining the elemental contents in aerosols at this specific sampling location. There are two comments that I wish the author can address in the revision.

Reply: We would like to thank ref#3 for reviewing our manuscript and recommending it for publication after minor revision. We have addressed these comments and revised the manuscript accordingly. Please find more details below.

(1) In the Figures 3, 4 and 5, It would be helpful to convert the mass to concentration in the atmosphere, which may be easy for comparison with other studies.

Reply: The aim of work is inter-comparison of masses measured in each sample, rather than the presentation of sample composition for comparison with other studies; as a result, we believe that using the result of experimental analysis (in mass) makes more sense than showing concentrations. On the other hand, we understand that some readers may also be interested in concentrations which can be obtained with the information of volume of air sampled.

As a result, in the revised manuscript (page 6) we have provided the volume of sampled air in the caption of Table 1: "...d: filtered air volume was 59 m³ for each subsample..." Moreover, we have added one sentence (page 8) to provide such information: "Furthermore, each laboratory received one portion of each of the remaining 26 filter samples (D1-D26) for conducting the leaching method intercomparison. These sub-samples (D1-D26) each had a sampled air volume of 59m³, which can be used to convert data presented in this study into atmospheric concentrations."

The samples marked with YS show higher variations in elemental masses and some of them have much higher values. Please comment on the potential reasons for this.

Reply: This is possibly caused by their sources; for example, YS samples, if affected by shipping emissions, can exhibit very high V concentrations; nevertheless, it is beyond the scope of this manuscript to explain why YS samples show higher variations in elemental masses. As a result, in the revised manuscript (page 32) we have made the following change to discuss the influence of aerosol provenance on total and soluble elements measured: "The aerosol provenance seems to be a key driver of the resulting amount of total and soluble trace element measured, regardless of the leaching protocol used."

(2) It would be interesting to see the overall variations among these leaching methods for each element in each sample. For example, showing the ratio (to the median or means of all eight methods) for each leaching method (and elements). Such information could give us a general idea of the magnitude of variations that one may expect. Please include a summary or section of this information.

Reply: The information that ref #3 requests has already been presented in our original manuscript (Table 6, which is now Table 7 in our revised manuscript) and Figure 6. This table displays the ratios of the median solubility values obtained for the AmmAc vs UPW

(AmmAc/UPW) and for the Berger vs UPW (Berger/UPW) methods. In addition, Figure 6 provides a good visual summary of the different measurements (solubility) and magnitude difference obtained using the eight methods tested.