

23/07/2014

Letter to editor

ACP-2014-279

Dear Editor

We thank you very much for your attention to our manuscript.

We have reply to both Referee Comments within the interactive discussion, taken all technical comments into consideration, and revised our manuscript accordingly. Deleted sentences are highlighted in pink, while added parts are highlighted in blue.

The most important comment raised by the Referees is related to the benefit of the proposed PMF<sub>x</sub>PMF methodology. Referee #2 stated that “although the source apportionment results compare favorably with some previous studies, the four-factor solution can likely be achieved by conventional PMF analysis using only OA concentrations”. We raise here your attention on the fact that our approach represents an attempt to statistically bridge OA factors obtained using a “traditional AMS-PMF methodology” to pollution sources. We see that as a major benefit of the proposed methodology, which cannot be obtained directly via a conventional PMF analysis as proposed by Referee #2. On the other hand, Referee#1 suggested that “the science may be better served by using the BC factors directly in the first PMF step” combined with all organic fragments and ions. Following Referee#2 suggestions, we have performed such a single PMF analysis and demonstrated within AC C5935 that it is not appropriate to our dataset. There might well be other PMF approaches that could happen to be as efficient as the one we are proposing to apportion the PM<sub>1</sub> fraction. However, (i) these methodologies would probably not allow for allocating OA factors obtained from a “traditional AMS-PMF analysis” to more accurate pollution sources, (ii) we have performed various sensitivity tests (which are exposed in the Supplementary Material and now summarized in a new paragraph of the “conclusion” section) demonstrating the validity of our approach, and (iii) the objective of the present manuscript is not to inter-compare alternative PMF methodologies, which could be the subject of a following paper. For all these reason, we do not think it would be appropriate to present results from a single PMF analysis in our manuscript.

We hope that our responses convinced you and both Referees that the revised manuscript we have submitted fully meets Atmospheric Chemistry and Physics standards.

With our Best Regards

On behalf of the co-authors,

Jean-Eudes Petit