

The authors are grateful to the editor for comments and suggestions.

Our answers follow in italics:

General comments

1) I am not in favor of capitalizing Secondary Sulfate and Dust aerosol. These are not fixed terms or names and thus should be written in lower case letters.

They are changed to lowercase letters in the new version of the manuscript.

2) Figure captions: (i) Please make one figure caption per figure, even if the figures include multiple panels (a, b, c etc), instead of having a caption under each panel.

There is now one caption under each panel.

(ii) if there is only one panel (e.g. Figure 8), there is no need to have a description including (a).

This correction is applied in the manuscript.

(iii) please improve all figure captions such that they describe what is shown and can be understood without having to read the full manuscript text (e.g. Figure 8 is much too brief)

The figure captions are improved in the manuscript.

(iv) Make sure that all figures are accessible for readers with vision deficiencies; check them with COBLIS <https://www.color-blindness.com/coblis-color-blindness-simulator/> Rainbow scale color scheme should be avoided to have unambiguous contrasts. Consider using different symbols if possible, e.g. in Figure 9.

The color palettes used are changed so as to be accessible by readers with vision deficiencies. I used different symbols when possible.

3) Please provide a data availability statement according to the journal requirements

https://www.atmospheric-chemistry-and-physics.net/policies/data_policy.html#data_availability

*I have uploaded the necessary files and I acquired the following DOI:
10.5281/zenodo.7912792*

Specific comments

l. 27: The sentence 'This work is the follow up of the article by Almeida et al.(2020).'

seems out of place here and can be deleted. It may be better placed in the next sentence, e.g. by replacing 'in the aforementioned publication' by 'as identified by Almeida et al (2020)'.

This is now changed in the manuscript as suggested.

l. 71: Please add a reference to EN12341

A reference was added:

EN12341: Determination of the PM₁₀ fraction of suspended particulate matter - Reference method and field test procedure to demonstrate reference equivalence of measurement methods., Tech. rep., CEN, 1998.

I. 73: Please add a reference to EPA PMF5.0

A reference was added:

Brown, S. G., Eberly, S., Paatero, P., and Norris, G. A.: Methods for estimating uncertainty in PMF solutions: Examples with ambient air and water quality data and guidance on reporting PMF results, Science of The Total Environment, 518–519, 626–635, <https://doi.org/10.1016/j.scitotenv.2015.01.022>, 2015.

I. 74-76: Some text seems redundant here stating that only 50 samples were available for the six cities.

A redundant sentence was removed.

I. 92: what does the '(sensitivity)' here refer to? Can the word be simply deleted?

The word '(sensitivity)' was removed.

I. 101: do you mean 'included in the model'?

It is changed in the manuscript from 'included in the results' to 'included in the model'.

I. 125: Sometimes, you use 'we', sometimes 'the authors'... Using 'we' is more common and should be used for consistency (or replaced by passive voice).

We have replaced 'the authors' in the manuscript with 'we', or passive voice, whenever applicable.

I. 172: Please a reference for the report.

We have added references for the AIRUSE project.

I. 176: 'Smaller differences...' sounds odd after the preceding text of '0 differences' (a difference < 0?). Please clarify.

We have rephrased lines 175-177:

'We seek in our case a smooth solution, requesting that emission fluxes of neighboring cells have differences close to 0, while at the same time the measured concentrations are reconstructed by the solution. Solutions with small emission fluxes absolute values have smaller differences in neighboring cells than solutions with large emission fluxes absolute values. This imposes solutions with emission fluxes as small as possible, leading to the underestimation of measured values.'

I. 213: do you mean 'multiplied with'?

We have rephrased in the manuscript "multiplied into" to "multiplied with".

"Thus, to reduce the effect of small values of $n_{i,j}$, an empirically determined weight matrix is multiplied with the PSCF value to better reflect the uncertainty in the values for these cells (Polissar et al., 2001)."

I. 224: replace 'that' by 'for which

We have replaced in the manuscript "that" to "for which".

"In appendix A1 we display the PSCF results for the rest of the cities for which a secondary sulfate concentration was identified."