

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2022-269

Anonymous Referee #2

Referee comment on "Measurement report: Characterization of sugars and amino acids in atmospheric fine particulates and their relationship to local primary sources" by Ren-Guo Zhu et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-269-RC2>, 2022

Title: Measurement Report: concentrations and composition profiles of sugars and amino acids in atmospheric fine particulates: identify local primary sources characteristics

In this manuscript, sugars (anhydro sugars, primary sugars and sugar alcohols) and amino acids (free and combined) were determined in atmospheric fine aerosol particles (PM 2.5) collected from urban, rural and forest locations. The multiple trends observed for the different compounds and locations and their potential correlations were widely discussed. In addition, positive matrix factorization was used for the identification of local primary sources.

It is well known that organic aerosols (OA) have a clear impact on the climate. In this way, the determination of water-soluble compounds such as sugars and amino acids in OA collected from different geographical locations might be considered of great relevance to elucidate potential emission sources. Different statistical techniques such as Pearson correlation or positive matrix factorization were used to establish the potential differences between the samples collected at different locations, identify the potential emission sources and quantify their contribution to the total aerosols. In general terms, results achieved in this research are promising and they could be of great interest for the atmospheric chemistry and physics researchers. However, there are some points related with the manuscript structure and the use of the different statistical tools that might be improved and/or clarified.

On one side materials and methods section includes a whole subsection devoted to sugar analysis. Almost no information (3 lines) has been included about the analysis of free and combined amino acids. It could be interesting provide a reliable summary of the analytical methods on the main text. Detailed information might be provided as reference or in the supplementary information section. On the other side, it could be difficult for the potential readers a detailed evaluation of the results showed in results and discussion section. Most of the results achieved for the analysis of the sugars on the samples has been included as

supplementary information. However, the results achieved for amino acids has been included as figures in the main text. This could be a bit confusing even if some of the results obtained for the sugars are also shown in these figures. Furthermore, it should be clarified if data distribution has been evaluated by the authors. Normal data distribution is required for most of the used algorithms and no-information is provided in the text. Finally, the use of certain terms as "good correlation" or "highly correlated" is not clear and it should be reconsidered.

Therefore, this manuscript is not deserved for its publication in Atmospheric Chemistry and Physics in the present form, but it could be published after clarification of the following points:

Abstract

This section is pretty large and it should be condensed. However, quantitative results are mostly missing in the abstract.

Line 18. Sampling locations should be specified in the text.

Line 20. Analytical technique used for the determination of the compounds might be clarified in the text

Line 28. This abbreviation (L/M) should be defined in the text before it first use.

Line 32. R² and p-values should be included in this section for correlations.

Introduction

Lines 66-67. Not a clear link with the previous sentences.

Line 96. This abbreviation (HAAs) should be defined in the text before it first use.

Lines 104-109. This paragraph is a bit confusing; it could be interesting to clarify the aims of the study and then the different methodological improvements.

Line 106. Reference should be included in the text.

Materials and methods

Line 121. Avoid the use of numbers at the beginning of the sentences.

Line 125. The time between the sampling and the transport to the laboratory should be clarified in the text. In addition, storage temperature in this step should be clarified in the text.

Line 130. Have the authors considered the adsorption of the target analytes on the quartz wool during the sample preparation.

Line 149. At least $R^2 > 0.99$ are required for quantitative purposes.

Line 150. Preparation of field blanks should be clarified at some point (text or supplementary information)

Line 155. Results should be avoided in the material and methods section. This information might be provided at results and discussion section.

Line 166. Additional information about the selected methodology might be interesting for the potential readers.

Lines 167-169. Results should be avoided in the material and method section.

Results and discussion

Line 213. It could be interesting to clarify if reported results can be associated to pre- or post-pandemic samples.

Lines 276 and 278. The selection of these groups of amino acids for study might be clarified in the text.

Line 300. The use of the combination of Gly and Phe for the evaluation of the results should be clarified in the text.

Line 338. Not clear that this is a good correlation. A more appropriate term might be correlation at 95%. In addition, the number of samples included in the model should be provided in the text.

Lines 405-406. These reference should not be considered as recent references.

Line 428. References from previous studies should be included in the text.

Lines 493-494. Results obtained for L/M should be expressed homogeneously.

Line 501. Please check the use of capital letters at the beginning of the sentences.

Figures

The number of figures is pretty large. Some figure should be summarized or moved into

supplementary information.