

Comment on acp-2022-269

Anonymous Referee #1

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-RC1>, 2022

Zhu et al. investigated the concentrations and compositions profiles of sugars and amino acids in atmospheric fine particles to identify the source contributions at the urban, rural and forest sites in Nanchang, China. Sugars including anhydrosugars, primary sugars, alcohol-sugar were studied here as some tracers of sources. Together with the results of combined and free amino acids, the sources were identified using correlation analysis and a receptor model of PMF. It is a nice presentation on field measurement of organic tracers to suggest the possible local sources. My concerns are show as follows. I hope they could help improve the quality of this manuscript.

- I do not think that PMF is suitable for the source apportionment in this study. We should be aware that there are only 14 samples at every site. It may cause large uncertainties on the outcome of source apportionment. The lack of secondary reaction tracers would easily underestimate the contribution of secondary processes. The results in Figure 8 also clearly show that the source profiles are very different even they are attributed to a certain source. The results shown in Figure 9 may not be reliable due to the highly possible uncertainties. It is not recommended to keep PMF source apportionment in this manuscript.
- I found that the temporal variations of the organic tracers are quite different at the three sites e.g. total sugars and amino acids in Figure 1. The variations have not been clearly presented and discussed in the text. The difference may point to the contribution of sources along the sampling period.
- Based the conclusions and discussions as well as the associated studies, biomass burning is expected and suggested as one of the major sources. I think there more efforts should be put on the identification of this specific source. A separate section is suggested. By the way, the discussion on sources of lignite combustion and road dust seem vague and should be improved.
- The authors claimed that some specific combined amino acids represent certain source contribution. For example, in Line 274, "anhydrosugars, combined Gly and Phe may be influenced by the identical source". It is really not the case because CAA(s) are hydrolyzed products from certain proteins or peptides. One or two CAA(s) may not be released from a certain sources.

- Line 243-247: I do not understand why? Trehalose is not a specific tracers of road dust.
- Line 278: Why the sum of Ala, Val, Leu and Ile are calculated? As I mentioned above, they are dependent on the proteins and peptides in aerosol samples but we should have known nothing of them in this cause.
- Line 284-289: Why they are separated into four groups? A reason is necessary.
- The text in Line 312-325 presents some background information. It can be shortened.

9. Maybe the authors should rephrase the title. Make it clear and concise.