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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Measurement report: Amino acids in fine and coarse atmospheric aerosol: concentrations, compositions, sources and possible bacterial degradation state" *by* Ren-guo Zhu et al.

Anonymous Referee #1

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The manuscript represents an important contribution to the study of atmospheric amino acids. These important compounds are recently better investigated, and the scientific community are step by step understanding their importance to investigate sources and processes in the atmosphere. For this reason, I think that this paper should be recommended for publication after addressing the issues listed below. In general, a very important dataset is present in this paper, but I found the manuscript, and in particular the results, quite hard to follow them. I suggest the authors to simplify the results, for example, reducing the number of sections and to link each section to help the readers.

General comments

Abstract. In the abstract the use of acronyms is inappropriate as well as it is dissuaded to insert the references.

Line 70. I think that you have to better introduce the degradation index to help the reader. I saw its explanation in section 2.3 but some details have to be introduced also in the introduction.

Section 2.1. I think that you have to add some information about the type of filter used and the cleaning procedure of this filter. You have to add the reference but I think that you have to insert this information in the main manuscript.

Section 3.2.3. This part is too short to be one section and I suggest to add this sentence to another section.

Line 295. I don't understand why you use PC1 as coefficient. This principal component clearly distinguishes the fine and the coarse particles. I think that this point should be clarified in the manuscript.

Section 3.3.4. I think that you have to define the meaning of DI values, also considering previous published results. You have to define the threshold when bacterial degradation occurred.

I don't like so much this fragmentation of the section. This is only my opinion, but I think that this fragmentation produces to lose the thread. You have the sections with 4-5 lines.

In the conclusion, you affirm that "The difference in δ15N values of Source-AA and THAA between coarse particles and fine particles were small," but one of the main aim of the manuscript is the follows: "δ15N values of Gly and THAA in fine and coarse particle were compared with those in main emission sources to identify the potential sources of fine and coarse particles.". So is the conclusion that δ15N values are not good tracers to define the sources?

Specific comments

Lines 42-43. I suggest rephrasing this part because I think that English form is not correct. For example you repeated “compound”.

Line 43. I suggest to insert this reference because it summarized very well the state of knowledge in the 2016: “Matos, João TV, Regina MBO Duarte, and Armando C. Duarte. "Challenges in the identification and characterization of free amino acids and proteinaceous compounds in atmospheric aerosols: a critical review." TrAC Trends in Analytical Chemistry 75 (2016): 97-107.”

Line 45. Here a reference is needed.

Line 50. I suggest you this paper where the particle size distribution of free amino acids is investigated until nano dimension: “Barbaro, et al. "Characterization of the water soluble fraction in ultrafine, fine, and coarse atmospheric aerosol." Science of The Total Environment 658 (2019): 1423-1439.”.

Line 67-69. I think that you should also add the investigation of Kuznetsova et al. “Kuznetsova, M., Lee, C., Aller, J., 2005. Characterization of the proteinaceous matter in marine aerosols. Mar. Chem. 96, 359e377. https://doi.org/10.1016/j.marchem.2005.03.007

Line 114. Have you verified the recovery of amino acids from the cationic cation exchange column? Figure S1. Please add (F) and (C) in the caption after fine and coarse. Change “blue” with “green” because I saw green the coarse particles.

Lines 186-187 and in other sections of manuscript. Please consider to significant figures. For example, “2542.9$\pm$1820.1 pmol m-3” should be 2542$\pm$1820 or the best way is 3$\pm$2 nmol m-3. I found the same mistake in the % values.

Lines 421. Please consider that the combined amino acids were investigated also in the Arctic region, considering also the particle size distribution. Feltracco, et al. "Free and combined L-and D-amino acids in Arctic aerosol." Chemosphere 220 (2019): 412-

421.

Lines 430-432. You have completely skipped the marine contribution. Several studies conducted by prof. Leck (Leck and Bigg, 2005a, 2005b; Bigg, 2007; Bigg and Leck, 2008) demonstrated the sea emission of PBAP. Combined amino acids is surely one of the main component of PBAP.

Technical correction Line 23. Please remove one point from (p<0.0.1). Line 80. Please change as “particle sizes” Line 90. Change “was” with “were” Line 105. Please introduce the acronym HAA

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