

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2021-576

Anonymous Referee #2

Referee comment on "Free amino acid quantification in cloud water at the Puy de Dôme station (France)" by Pascal Renard et al., Atmos. Chem. Phys. Discuss.,
<https://doi.org/10.5194/acp-2021-576-RC2>, 2021

Renard et al. present a very interesting study about free amino acids in cloud water at puy de Dome. Such data are rare and strongly needed. The data are well-presented and discussed. The general style is good and the English very well readable.

However, several things should be considered before publication:

Line 105 and following: The samples are spread over a wide temporal range. First of all, please add the year, whenever you are referring to a sample in the Tables and in the text (not just day and month), as several years are regarded. What about possible artefacts, especially due to the long sample storage time? Could you add more details how the samples were treated (e.g. filtered before freezing)? Did this sample treatment or storage affect e.g. biological measurements? Did you check this?

Line 114: Please add information on the collection efficiency of the cloud water sampler.

Line 183/184: You report the linearity (R^2), However, this value alone is not sufficient to describe the correlation, as e.g. a good linearity can be obtained by a good fit of just one high calibration point. Please consider to add values that describe the significance (such as the p-value). You show only one calibration curve of the standard addition (Fig. S3) of a sample containing high concentrations. I am wondering how it looks like for lower concentrated samples.

Line 200: Why do "marine" clouds have a low ion concentration? I'd expect some levels of sea salt.

Line 255: How is the ABLH determined?

Please add information about the volumes of cloud water used for the analysis. Standard addition is a method with many advantages, as the authors pointed out, however it consumed a high amount of samples as several aliquots are needed. Could you please comment on that. And did you compare the standard addition to an external or internal calibration to check for possible matrix effects?

Line 299 and following: I am wondering what information can be obtained from this paragraph and Fig. 4. A statistical method is applied but I don't see a clear new result. It just "confirms" Fig. 3 and this section is not clear to me. Please improve and show the results obtained here.

Line 328: I am in doubt that "analytical tools" can explain the explained discrepancies. Why should different analytical methods show non consistent results on the concentration and composition on the amino acids?

Tab. 2 line "Cabo Verde" HPLC-MS does not go together with OPA derivatisation. This seems to be an error, please correct. Same for Table S4.

Table 3: Is "R" or "R²" shown here? To this: line 392: I am in doubt if a correlation of 0.4 is "significant". If you use this expression, please state your definition of significance. In general I am not convinced from the shown correlations. Here again, p-values would help.

Line 391: " ... a potential influence of the photochemistry.." on what?

Line 394 and Fig. 5, similar comment as above (Fig.4): I am not familiar with this type of graphs and discussion but I don't see the clear benefit from this chart and discussion. Could you more clearly show the results and its importance?

Figure 6 is more "result" than "discussion".

Chapter 4.1: I have some difficulties with this section. It seems that some examples are picked to explain the AA composition in relation to biological processes. I wonder how representative these explanations are. More references are needed. For example, the explanation of peptidoglycans as a source strongly needs references. What kind of microorganisms have peptidoglycan in their cell walls? What other types of glycanes exist? In the next chapter you report serine as constituents of diatom. Also here references are missing. I'd recommend to the authors to perform a more thorough discussion of the possible biogenic connection rather than choosing some examples that seem to fit to their results. What about long range transport of glycine? What about other serine sources (besides diatom)? I believe there are also more references on the composition of amino acids in seawater during a bloom period besides the one from Ittekkot, 1982. Biological processes are certainly one source of amino acids, but this discussion does not seem to improve the current knowledge at its current state.

Line 495: specify "one".

Line 524/524: It is not clear if you are referring to the present study or to a result from literature.

Line 539: same comment as above. If you refer to a literature study please add a reference.

Line 553: please replace or specify "behavior"

Line 563: There seems to be something missing at the end of the sentence (AAs concentration/composition?)

Tables in the SI: I strongly recommend to insert the actual LOQ (rather than stating "below LOQ"). The authors apply a method without any enrichment/preconcentration steps, therefore it is important to see the sensitivity of the method right away. It took me a while to find the values in the manuscript.

Why are several samples classified as "marine" (Tab. S1, page 2) although they spent a lot of time over continental surfaces (Tab. S1, page8), for example: the "13 Jun" sample?