

Atmos. Chem. Phys. Discuss., referee comment RC1
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Comment on acp-2021-576

Anonymous Referee #1

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-RC1>, 2021

Renard et al. present interesting information about the composition of free amino acids (AA) in cloud water from a French mountain site. The LC-MS analytical work is sophisticated and sensitive. Care is taken to avoid important artifacts associated with matrix effects commonly found in LC-MS analysis of complex environmental samples. The results are novel and the authors do a good job exploring several hypotheses related to factors influencing the abundance and relative composition of the observed AA. I do have several suggestions to improve the manuscript prior to publication.

- Please provide more detail about experimental methods
 - Add a short description of the cloud water collectors
 - Provide more detail about the instruments and materials used, such as the manufacturer of the nylon filter and the model of the Shimadzu TOC analyzer
 - Line 118: be more specific about storage temperature and storage times prior to analysis for particular analytes, especially the AAs.
 - Please add a reference for the Gerber Scientific PVM-100.
- The authors compare AA compositions of cloud water samples collected over 6 years. Are they confident that differences in AA abundance and relative composition are not affected by differing storage times/conditions?
- Line 223 and abstract: Standard addition prevents introduction of analytical biases resulting from matrix effects. It does not actually prevent the matrix effects.
- The authors need to better distinguish the two sections of the manuscripts discussing STD. On p. 7, it would help the reader if they clearly indicated that they are speaking about the precision of the measurements of AA while they later discuss the variability of concentrations across different cloud samples. In both places the authors tend to rely on the jargon of discussing STD. More nuance in the descriptions would help.
- The authors are correct that not many publications have reported concentrations of speciated AA in cloud, fog, or rain. They did, however, overlook an early, seminal paper by Mopper and Zika (1987) *Nature* **325**, 246-249. They should review this early paper, add it to their comparison tables, and include its findings in their discussions of comparisons to their current work.
- Please replace "hydropathy" with hygroscopicity throughout. Replace "multiphasic" with multiphase.

- The authors switch between referring to the Cape Verde Islands and the Cabo Verde Islands. Please switch all to Cape Verde Islands.
- Please change terminology so that you refer to trajectories within (not below) the boundary layer.
- Liquid chromatography is coupled to mass spectrometry, not "hyphenated to" it.
- The manuscript contains numerous errors in grammar and syntax and several awkwardly phrased sentences. There are also unusual choices to capitalize certain words (e.g., Sea, Free, Continental, all of which should not be capitalized), some misspellings (e.g., De Hann), many cases of singular-plural disagreements between nouns and verbs, and numerous poor choices of prepositions. With a few exceptions, the authors' meaning is clear, but the text would greatly benefit from English language editing.