

## ***Interactive comment on “Amino acids in Antarctica: evolution and fate of marine aerosols” by E. Barbaro et al.***

### **Anonymous Referee #1**

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**General comments** This work presents the results of more than four field studies in the southern hemisphere, targeting the role of amino acids in aerosol loading. The remote nature of this work makes these data especially precious. In the larger context of characterizing marine organic aerosol, these findings are even more valuable. The paper is generally well-written and clear, but I have some recommendations for sections that should be improved. Although numerous, my comments are largely minor in nature; therefore, I recommend this paper for publication with minor revisions.

**Specific comments** Pg 17081 First two paragraphs: I find this entire section very hard to follow. The use of the phrase, "In the present work," in Line 4 implies that the Dome C data discussed above are from another study. However, I gather they are not. Further, the Dome C station is not the only location where AA were found primarily in C5326

the backup filters. According to Figure 2, the MZS samples also showed the highest concentration of AA in the backup filters.

Pg 17081 Same section: "This evidence suggests that hydrophobic amino acids present in the coarse particles are less reactive." I don't see how the data support this conclusion. It might, but it needs to be better explained.

Same paragraph: "This indicates that the coagulation processes with the relative increase of Ala concentration in larger particles are probably together with slow oxidation processes." The wording "probably together" is confusing, please reword this sentence.

**Conclusions:** "This first study on the distribution of Antarctic amino acids permitted to identify the marine source of aerosols and to study the ageing of aerosols." This summary is overstating the findings of this work. I suggest, "This first study on the size distribution of amino acids in Antarctic identified sources of marine aerosols in this region and characterized some transformations taking place as marine aerosols are transported to the interior of the Antarctic continent." Line 7: Instead of what?

Figure 2: The inset contains more information than the larger figure and it makes sense to swap the two figures, such that the inset becomes the main figure.

Figure 4: The distributions of AA are very hard to compare in this format. It might be useful to see the distributions as fractions of total AA and to have a separate indicator for total AA.

Figure 6 was generated with a different software package than the others and the text on the axes is blurry.

**Technical corrections** The paper would benefit from editing by a native English speaker. There are numerous awkward sentences and grammatical errors, especially in the second half of the manuscript. A few are itemized below.

Pg 17068 Line 2: replace "the latter's" with "their" Lines 17-18: since amino acids are biological material, it would be more accurate to say "intact biological material"

Pg 17070 line 1: Type-o, replace De Hann with De Haan Line 23: Since Antarctica is a continent, I believe the authors are referring to sources requiring exposed rock or soil. If so, this might be clarified.

Pg 17071 Line 13 : replace "the single amino acid" with "a single amino acid" Line 15: insert "us" after "allowed"

Pg 17076 Line 16: in this and other cases, replace "dominant" with "predominant" Line 18: remove the pluralization of "others"

Pg 17079 Line 21: "A prominent marine source was revealed by the cluster means backward trajectories analyses analysis of all the samples" It is not clear if the "analyses analysis" is a mistake or just an awkward wording.

Pg 17082 line 12: Omit "the" before Figure 5

Pg 17082 Line 17: "A longer time inland can be improved chemical and photochemical reactions" I'm not sure what this means, but I think it should read, "A longer transportation time from the source to the sampling site allows for more chemical aging, including photochemical reactions, to take place."

Pg 17083 Line 27: replace "better" with "calmer" to be more specific.

Pf 17084 Line 6: replace "a strong presence of " with "expansive"

Pg 17085 Line 2 and other cases: the authors are switching from past to present tense inconsistently. The air masses "came" from inland in this case, but likely do not always. Lines 7 and 11: the word "relevant" is misused here. I believe the authors mean "significant," "noteworthy," or "detectable."

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