Author's Response:

Dear editor,

Thank you again for your attentive lecture and the assiduous comments on our manuscript. We carefully considered all the comments and questions and revised the manuscript accordingly. Please find below a point-by-point response with a list of the main changes (in blue).

Reviewer #1

Comments:

Figure 5 - Can the authors please double check the Na+ concentration distribution for the three events. It seems weird to see the highest Na+ concentration in an air mass originating from brackish water and land (CR2, Fig 4 A-D) and a low Na+ concentration coming from open sea (marine water) and land (HIR, Fig 3A).

We checked the data and we confirmed the Na+ concentration values for the three events. The high value of Na+ measured during CR2 was associated with a high value of Cl-. The ratio Cl-/Na+ during CR2 (1.16) was closer to the seawater ratio (1.1), confirming a marine influence from the Mediterranean and Black Seas at low altitudes (Suppl. Fig 2 F).

During HIR, the seawater ratio was higher than the seawater ratio, reaching 1.75, confirming the open sea water influence and the presence of anthropogenic chloride wet deposition (Salve et al., 2008; Keresztesi et al., 2019). The difference in the ion concentrations could be a consequence of possible chemical reactions and/or loss of chemical species during the passage from sea to land (Möller, 1990). Finally, if previous wet deposition occurred before the rain events recorded at Aydat, an underestimation of the sodium concentration in the rain could be reported during HIR for example.

Line 354 – Please remind the reader how many samples were collected in CR1. Here the detection of phycocyanin was in 2 (out of how many samples?), or perhaps call for figure 6.

Moreover, to facilitate the read for this paragraph, knowing that the paper is directed to a broad audience, I believe it is important that the authors mention which kind of microalgae they are expected to detect with phycocyanin signal (which microalgae possess phycocyanin pigment) and which one the phycoerythrin.

The CR1 event was composed of 3 intra-events named CR1a, CR1b and CR1c (Fig. 6). The figure 6 is mentioned in the text line 358.

Line 292-293: We completed the material and method by mentioning the group of phytoplankton that are detected in flow cytometry for each gate. Hence, the "chlorophyll" gate allows only species without the phycocyanin or phycoerythrin pigments, such as Chlorophyceae, Diatoms, and Chrysophyceae. The phycocyanin gate allows the detection of blue-green cyanobacteria whose major pigment is C-Phycocyanin. Finally, the "phycoerythrin" gate detects the pink to yellow cyanobacteria and the Cryptophyceae (Read et al., 2014). However, some pollen may also be detected in the "phycoerythrin" gate.

Lines 327-328 and 497 - These water systems are brackish waters.

We mentioned in the text brackish water instead of marine source to discriminate from open sea.

Line 506 - The terminology is not proper! as mentioned in ulterior review report of this manuscript, the term microalgae encompasses both eukaryotic (i.e. bacillariophyta, charophyte, chlorophyll, miozoa) and prokaryotic (i.e. cyanobacteria) organisms. A possibility is to write “information about eukaryotic microalgae and cyanobacteria in rainwater…”.

We thank the reviewer for pointing this imprecision which has been corrected by adding the term eukaryotic before microalgae (line 509).

Lines 590-604 - This is a rather simplistic explanation that works within the time frame of this experiment. The authors observed the phytoplankton dynamic over max 2 weeks. However, the authors should not neglect the biology and ecology of the species. Many studies (including limnic studies) have been performed on species introduction and species invasion. Long term analyses would be more suited to discuss about the repercussion on lake ecology. Note that the thematic is better expressed in the conclusion section.

We added sentences in discussion (lines 612-617) and conclusion (lines 671-674) to discuss about the limitation of the method.

Minor comments:

Line 73 - There are a couple of issues in this sentence. 1) Either some words are missing or “and could” needs to be removed. 2) Precise an increase of what; abundance or perhaps diversity?

We removed “and could” and added the term abundance

Line 90 - It seems that words are missing in this sentence: “However, their being washed out”. Perhaps “their capacity at”?

We corrected the sentence

Figure 1B - The figure contains two diagonals of unexpected green pixels.

The green pixels are not present on the picture into the PDF, a new upload in a different format should correct this.

Figure 1C - To increase readability, please indicate that the elevations between brackets are above the sea level.

On the figure 1C, we added the cloud attitude level from the sea level instead to the ground level.

Line 347 - Do the authors use the usual 5% significance level? In the case of p=0.066 for the sodium ion concentration, the difference is only marginally significant. Please check again this value or adjust the text.

The significance level used was 5 % but we drop a 0 at the p-value which is 0.0066 (**).

Lines 351-352 / 381-386 - The unit is usually given in cells.L-1

We added an “s” at the unit.

Line 453 - How was the positive relationship assessed, statistically or from visual observations from graphs?

The positive relationship was assessed statistically by Multiple factor analysis, which are representing by the correlation circle on the figure 8 C.

Line 650 – “highlight” instead of “highlighting”

We corrected the sentence

Best regards,

Fanny Noirmain

References:

Keresztesi, Á., Birsan, M.-V., Nita, I.-A., Bodor, Z., and Szép, R.: Assessing the neutralisation, wet deposition and source contributions of the precipitation chemistry over Europe during 2000–2017, Environ. Sci. Eur., 31, 50, https://doi.org/10.1186/s12302-019-0234-9, 2019.

Möller, D.: The Na/CL ratio in rainwater and the seasalt chloride cycle, Tellus B, 42, 254–262, https://doi.org/10.1034/j.1600-0889.1990.t01-1-00004.x, 1990.

Read, D. S., Bowes, M. J., Newbold, L. K., and Whiteley, A. S.: Weekly flow cytometric analysis of riverine phytoplankton to determine seasonal bloom dynamics, Environ. Sci. Process. Impacts, 16, 594–603, https://doi.org/10.1039/C3EM00657C, 2014.

Salve, P. R., Maurya, A., Wate, S. R., and Devotta, S.: Chemical composition of major ions in rainwater, Bull. Environ. Contam. Toxicol., 80, 242–246, https://doi.org/10.1007/s00128-007-9353-x, 2008.