

Response to Referees' Comments:

Anonymous Referee #2

Received and published: 22 May 2018

The technical aspect of the current paper is very good, and the data of very high quality. Being able to collect so many cruises with HR-ToF-AMS data is a really valuable contribution to the field. The paper is very suitable for ACP, but unfortunately major (big major) revision are needed:

Reply:

We thanks very much for referee's positive and constructive comments. The point-to-point responses are shown below:

- Introduction. Decide if you want to focus on the study area, or on the techniques, decide one flow and report it. At the moment there is confusion.

Reply:

Yes, the introduction part was confusing. We have rewritten the introduction to focus on the motivation of this study (referring to mainly the study area rather than the techniques). Also, we reorganized the abstract according to both referees' comments, in order to emphasize the key findings of this paper. According to referees' comments and co-authors' suggestion, we changed the title of this paper to "Organic aerosols over the Atlantic Ocean from 53°N to 53°S: a similar contribution of ocean and long-range transport".

- There are 144 references, really there is no need to add all these references, suggestion to cut to 60 max.

Reply:

Thanks a lot! Indeed the amount of references is big. Considering that the other referee suggested to refer to more previous studies, we added some comparisons with historical

studies and removed the less useful references. Finally we shrank the references amount from 144 to 87 now. The existing references are considered to be necessary for better explaining the key findings of this paper.

- Figure S8. Factors F1-F4 and F1-F6 in PMF analysis need to be better described and named accordingly to the names of Factor 5 solution. Report also correlations among factors so the reader can understand how the factors evolve.

Reply:

To keep the focus of the manuscript, we added the description of factor evolution in the supplementary. In Figure S8, we put annotations for each factor to note the similarity between factors from 4- and 6-factor solutions and the selected solution, for example, the factor similar to MOOA was named as MOOA-like factor in 4- or 6- solutions. An additional plot following Figure S8 showed correlations among factors (Figure S9) to explain the reason of naming and the changing of the factors.

- The paper is very descriptive, and many papers are cited and referenced. There is no need. For example the whole section of Page 13 can be cut

Reply:

The authors went through the whole manuscript and tried best to remove the sentences which were descriptive and less useful for the key findings. In Page 13, we reorganized the manuscript and removed most of the description of both MOA (now MOOA) and NOA (now MNOA) factors and shortened the discussion on them.

- pg 14 delete all topic of aminoacid, it creates confusion. These markers used are not unique of aminoacids.

Reply:

We agree with the comment and this is done.

- naming. perhaps you want to simplify the naming, for example the aPOA may simply be anthropogenic organic aerosol (surely there will be a component that is secondary)

and perhaps clearly stat that MOA POA and NOA are marine. NOA is marine, produced via secondary productions. Maybe start with "marine" or "anthopogenic" then "primary" or "secondary" then if it is Organic, nitrogen, MSA containing. Just a suggestion.

Reply:

We rethought about the naming of the OA factors and revised them for better indicating marine or anthropogenic sources. The MOA is now marine oxygenated OA (MOOA), NOA is changed to marine nitrogen-containing OA (MNOA), POA becomes marine hydrocarbon-like OA (MHOA), OOA is anthropogenic oxygenated OA (Anthr-OOA), and aPOA becomes combustion oxygenated OA (Comb-OOA).

- Overall it is advised that the senior scientists co-authoring this paper suggest how to improve the flow of the current manuscript.

Reply:

Thanks a lot for the suggestion. The senior scientists in the co-author list have read the manuscript and gave advices and suggestions on how to revise the paper. As you may see we reorganized the whole manuscript and rewrote many paragraphs in order to make the paper more clear and logical.

I congratulate to the authors (both corresponding authors in particular) for the impressive dataset collected - once the flow of this paper is improved, it will make a very important contribution in the field.

Reply: Thank you very much for your encouraging comments!