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Atmospheric Chemistry and Physics Discussions

Interactive comment on "High Summertime Aerosol Organic Functional Group Concentrations from Marine and Seabird Sources at Ross Island, Antarctica, during AWARE" *by* Jun Liu et al.

Anonymous Referee #3

Received and published: 7 April 2018

Comments on Liu 2018 Antarctica aerosol

General Comments

This paper covers a year's worth of organic aerosol measurements in a region that is rarely sampled and sheds valuable insight into the chemical composition of Antarctic aerosol. The paper is well-written and the figures and tables are clear and legible. Aside from minor corrections and qualifications, I have just one concern with the current form of the manuscript. The authors claim a connection between carboxylic acid variability and downwelling radiation that, for reasons I describe below, is misleading. Unless the authors can clarify and justify this correlation, I would recommend that the

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Discussion paper

discussion of that connection be omitted. Otherwise the paper needs only minor revision before it is suitable for publication. Given that this aspect may take more work to revise, I am selecting major revision in the online evaluation. However, the changes should not be overly burdensome.

Specific Comments

Pg 2 line 22: please give a value range for the “high fraction” of OH observed previously

Pg 2 line 25: similarly, what range of ON mass fractions have been observed? Is it a minor component, or major? Or highly variable?

Pg 5 line 5: I don’t see SLCE defined before it is use as an abbreviation

Pg 7 line 4: I’m unclear as to what the “factors identified as urban combustion emissions” is that correlates to the FFC factor. Do the authors mean “factor spectra”? Like, other FTIR PMF spectra? Please clarify.

Figure 6 and discussion on page 8 (and in conclusion/abstract): Drawing any relationship about photochemistry from the correlation between M&S carboxylic acid and DWR is misleading. The observed correlation, as I understand it, is simply the correlation between the M&S factor strength and down-welling radiation time series, since the carboxylic acid attributed to the M&S factor is always the same fraction of the factor (given in Fig 4), and so varies only as the strength of that factor. The same correlation coefficient (r) would be obtained for any of the functional groups present in the M&S factor and for the factor as a whole, as correlation coefficients do not change with addition/subtraction or multiplication by constants to the vectors being compare. Further, the downwelling radiation is varying only because of the season change (Fig 1) and the strength of the M&S factor, associated with the Adelie penguins, is also due to seasonal migration, so the observed correlation to downwelling is really just a product of the M&S factor and downwelling both having season characteristics. The authors would have to do more analysis and include other metrics to state that there

was any connection to photochemistry evident in this data set. I would need to see this suggestion/discussion removed before recommending publication.

Technical Corrections

There are extra spaces after most of the references when they end a sentence. Please edit the Latex code that is causing that.

In a number of cases there are spaces between value and % symbols, beginning in the abstract.

Pg 2 Line 1: insert a space between In and 1966

Pg 2 line 18: omit comma after “found that”

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