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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Single-particle characterization of the High Arctic summertime aerosol" *by* B. Sierau et al.

Anonymous Referee #2

Received and published: 6 March 2014

The manuscript "Single-particle characterization of the High Arctic summertime aerosol" by Sierau et al. presents the northernmost single-particle mass spectrometric aerosol characterization results to date. They find that the largest fraction of detected particles comes from long-range transport of biomass burning aerosol. The other major compound type was sea salt aerosol of different age, but the low number of sampled particles did not allow for adequate source analysis. The major problem of this study was indeed the low amount of particles sampled, in part due to the low number of aerosol particles in this region, and partly due to an unusually low hit rate of the ATOFMS.

While the paper does not directly present many new scientific findings, considering the amount of work needed to collect such a data set, I find it important to be published for

future reference. Upcoming studies acquiring single particle mass spectra in this region will certainly benefit from the information gathered from the 2700 sample particles in this study. I find the paper well-written and extremely thorough, with much information and speculation derived from the sampled particles. I therefore suggest publication following the small additions and changes suggest below.

Detailed comments

As I see one of the major contributions of this paper to be presentation of the data set itself, I recommend explicitly showing the mass spectra and time traces of all the cluster types. It lends credibility to show all such data, and in this specific case will show in detail the lack of statistics which make further analysis impossible for most of the cluster types. These data can also be shown in a supplementary material.

Fig. 4: I find this figure very confusing for several reasons:

- The y-axis shows a ”median” concentration for three values based on percentiles. It would be more intuitive at least to me, if the y-axis showed concentration, and then three distributions were plotted, which showed the median together with the 25- and 75-percentiles, as is usually done. Presumably it turns out to show roughly the same results.

- The distributions should be colored with different colors, and the scaling removed, so that one could actually see the variability.

- The legend shows numbers like ”2008x0.01” which is extremely confusing. The year 2008 should not be included here, as there are no other data presented in the paper, and should especially not be shown as a multiplication with some scaling constant.

The use of the word ”station” is a bit misleading, as typically stations are permanent structures. In case this terminology is in common use in previous publications, then it should stay, but if it is only used here, I suggest changing it to “site” or similar.

Technical comments

ACPD
14, C312–C314, 2014

Page 612, 18: “time series”

622, 9: “saccarides”

624, 6: “do not”

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 593, 2014.