

***Interactive comment on* “Tethered balloon-borne aerosol measurements: seasonal and vertical variations of aerosol constituents over Syowa Station, Antarctica” by K. Hara et al.**

Anonymous Referee #1

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This paper presents a very comprehensive data set of aerosol measurements in the Antarctic atmosphere. Different aerosol types have been identified using single particle analysis, and the results have further been segregated based on the particle size (two size fractions), season (different month) and altitude (several height levels between the surface and about 2.5 km). The methods and analyses appear scientifically sound. I strongly favor publication of these results, but only after considerable shortening of the “Results and Discussion” section and after addressing a few other, mostly minor, issues.

My main problem is the length of text in sections 3.4 to 3.7. As far as I understand,

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the main purpose of these sections is to give the reader a good picture on the vertical distribution of major aerosol types in the Antarctic atmosphere during the different seasons. Unfortunately, this message gets totally hidden behind the huge number of details presented in the text. Furthermore the text is descriptive in nature, rather than a scientific analysis. I strongly recommend that the authors cut the length of sections 3.4 to 3.7 into roughly half, and put the emphasis on discussing the main features of the data. For example, when analyzing seasonal differences, it is in many cases enough to differentiate between "summer" and "winter" rather than discuss each month separately.

The same problem as above concerns the figures. Having 8 figures (Figs. 2, 6, 9-12, 15, 16) with 24 sub-plots is much more than any reader can digest. If the authors really want to present all these data visually, that should be moved into Appendix. The main text should present only the most important features of these data (i.e. average differences in vertical distributions between different seasons, not vertical distributions in individual measurement days).

I like section 3.3. However, this section would become stronger if the authors added a short (one paragraph) discussion on how the different aerosol types observed here compare with those observed, for example, in the Arctic atmosphere.

The information give by the ternary sea salt plots (Figs. 7, 8 13 and 14) could also be condensed.

The section 4 is currently merely a summary of the results described earlier in the paper. This section should contain a paragraph with a few real scientific conclusions. The main scientific conclusions should be given in abstract as well.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 8153, 2013.

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