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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Seasonal features of ultrafine particle volatility in the coastal Antarctic troposphere" *by* K. Hara et al.

Anonymous Referee #2

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Presented paper discuss seasonal changes in aerosol volatility properties observed at Japanese Antarctic station Syowa and links observed volatility with aerosol chemical composition. Observations are discussed with respect to aerosol sources in coastal Antarctica and seasonal changes in these sources. The study is robust and well performed as well as data analysis and results well argued. However this paper does not bring really new knowledge, thanks to its uniqueness with respect to location and temporal coverage, it deserves publication in ACP

General comments:

The main issue I would like to ask authors to clarify is different size range for SMPS and TSMPS. The ambient SMPS delivers aerosol size distribution in size range up to 168 nm. The TSMPS up to 395 nm. It is not clear how the authors treated the

fact that ambient size distribution measurements ends shortly after the accumulation aerosol mode. If they only integrated SMPS measurements to obtain integral number and compared it to TSMPS, it will result in clear overestimation of non-volatile fraction. The way around it will be to compare total ambient aerosol concentration from CPC to integral aerosol number from TSMPS. It is not perfect, but it will deliver more reliable volatile and non-volatile fractions. The general message will not change, but numerical results will be more accurate.

Authors several times touch upon different aerosol properties between aerosol of likely FT origin and oceanic origin. I would like to suggest to follow this and analysis of volatility properties as a function of air mass origin not only on selected case basis but more comprehensive analysis of the sampling period. Air mass back-trajectory will be a good tool to start with. It will definitely increase significance of the paper and add very useful information on aerosol distribution and seasonal cycle in the Antarctica.

Detail comments

Abstract, line 9: why might? Results clearly show that it does Page 14778, line 16: most aerosol particles are distributed in ultrafine mode > 100 nm. This is not correct, there are many places where this is not the case. Page 14778, line 25: do you have a reference to a new particle formation through nucleation of H2SO4 or it is just best guess.

Page 14780, line 21: should be 180 min ?

Page 14780, line 22: change "one datum" to "one scan"

In chapter 3.4 (lines 25-27) authors argue about effect on climate change. It should be change to effect on climate. Sea salt is natural aerosol and its possible effect as a result of climate change can be discussed if authors show changes in temporal trend in sea salt aerosol number density linked to climate change (changes in sea ice coverage, temperature, etc.)

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 14777, 2011.