

Comments on the manuscript titled "The importance of Blowing snow to Antarctic Aerosol: Number distribution and more than Source-Dependent Composition –results from the 2ODIAC campaign" by Giordano et al.

This manuscript reports a 2-season (austral spring-summer 2014 and winter-spring 2015) campaign near McMurdo station, Antarctica, with research focuses on aerosol number density and composition as a function of air mass origin (via back trajectory analysis) and local meteorological conditions (mainly wind speeds). Their major conclusions are that 1) blowing snow has significant impacts on aerosol counts and chemical compounds (e.g. Cl:Na ratio, Br- and I- concentrations); 2) air mass origin has little influence. It is a well-written manuscript with in depth discussions in each section. I should be published in ACP with minor revisions.

General comments:

The first part of the Introduction section contains an overview of Antarctic aerosol studies, but mainly in instrumental aspect. Given the title/research focus of this manuscript is about blowing snow and relevant aerosol, a brief introduction is needed. For example, on page 3 lines 27-29, it reads ‘Some studies in Antarctica have hypothesized that elevated wind speeds can cause sea salt concentration differences through unknown mechanisms’, then which studies do you refer to? References should be supplied here. Yang et al. (2008) has proposed a mechanism of SSA production from blowing snow through sublimating saline wind-blown snow particles, which parameterisation has been implemented in global models to investigate high latitude SSA (e.g. Levine et al., 2014; Huang and Jaegle 2016; Rhode et al., 2017). Frost flowers are also thought to be a SSA source. More information can be found in e.g. Abbatt et al., (2012).

Yang, et al.: Sea salt aerosol production and bromine release: Role of snow on sea ice, *Geophys. Res. Lett.*, 35 (L16815), doi:10.1029/2008gl034536, 2008.

Huang J., Jaeglé, L., Wintertime enhancements of sea salt aerosol in polar regions consistent with a sea-ice source from blowing snow, *ACP*, doi:10.5194/acp-2016-972 (2016).

Levine, et al.: Sea salt as an ice core proxy for past sea ice extent: A process-based model study, *J. Geophys. Res. Atmos.*, 119, 5737–5756, doi:10.1002/2013JD020925 (2014).

Rhodes, et al.: Sea ice as a source of sea salt aerosol to Greenland ice cores: a model-based study, *Atmos. Chem. Phys.*, 17, 9417-9433, <https://doi.org/10.5194/acp-17-9417-2017> (2017).

Abbatt, et al: Halogen activation via interactions with environmental ice and snow in the polar lower troposphere and other regions, *Atmos. Chem. Phys.*, 12, 6237-6271, <https://doi.org/10.5194/acp-12-6237-2012>, 2012.

Section 3.7 (about bromine): Sander et al.’s (2003) global sea spray dataset clearly shows a general bromine depletion in micron mode, however, in ultra-fine mode, bromine is largely enriched. A similar phenomenon is also seen in polar dataset (Legrand et al., 2016). Do you have any comments on this size-dependent behaviour and relevance to your data interpretation?

Sander, et al.: Inorganic bromine compounds in the marine boundary layer: A critical review, *Atmos. Chem. Phys.*, 3, 1301–1336, 2003.

Specific comments:

P5L26: ‘An’ should be ‘an’

P6L1-2: ‘50m’ or ‘50mL’? A full stop is needed before the second ‘50 mL’ (?)

P7L28: delete the duplicated word ‘in’

SI Fig.S3: remove duplicated brackets in the caption.

SI Fig. S4: where are 'squares'? which 'solid' line (red or coloured) do you refer to?