

Interactive comment on “Concentrations, composition, and sources of ice-nucleating particles in the Canadian High Arctic during spring 2016” by Meng Si et al.

Anonymous Referee #1

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Review of the manuscript by Meng Si et al.

Si et al. investigated the concentrations of ice nucleating particles (INP) at Alert, Canada for three weeks in 2016. This study measured INP concentrations in the immersion freezing using the droplet freezing technique. The presented INP concentrations are within the ranges of previous INP measurements in the Arctic. Complementary measurements of tracers for mineral dust, sea spray aerosol, and anthropogenic aerosols were also conducted. The correlation of INPs with these tracers are also investigated. The subject of this manuscript is within the scope of this journal. There are some minor issues and comments that the authors may want to address or consider in

C1

the revision.

1. P4, L17-18, the particles were exposed to RH above water saturation, to what extend? Is there an estimation?
2. P4, L28 to P5, L11, it is not very clear how the upper and lower limits were calculated and how the freezing of non-spot droplets was considered in the INP calculation. It may be easy for reader to understand or to use such method if example can be provided in the supplement.
3. The spots of particles may contain more than one INPs. When cooling the droplet, the first or most efficient INP will trigger the freezing. Once the droplet freezes, it won't freeze again at lower temperature. This could lead to the underestimation of INP concentration. Please comment on this issue.
4. P6, L30-31, although the equation 3 is the standard method to calculate nss-so₄, how the Cl depletion in sea salt particles will affect these calculations.
5. P8, L31 to P9, L2, the manuscript states this assumption, it would be useful if the authors can add a short discussion on the potential bias this assumption may lead to the correlation analysis.
6. How the non-INP affect the freezing data when dissolve in the droplets, this is due to sampling method (collecting a spot of impacted particle vs. individual particles), such as salts including NaCl? This may need additional discussion.

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C2