Supplemental Information for

Ice nucleating properties of airborne dust from an actively retreating glacier in Yukon, Canada

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Figure S1. Surface area distribution of the particle suspensions extracted from filter samples and measured with a Coulter Counter in the current study with dilution factors taken into accounted. Error bars are not included for clarity.

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Figure S2. Range of [INP]_{air} for high latitude regions over the Arctic (grey shaded region) estimated based on measurements in previous studies (symbols).

Text S1: Analysis of dust composition.

Analysis by scanning electron microscopy coupled with energy-dispersive x-ray spectroscopy (SEM/EDS) was used to determine the mineralogy of particles collected, as previously described ¹. Samples were analyzed using a JEOL JSM 7600 F instrument under high vacuum, at a voltage of 10 kV and a working distance of 15 mm. A lower electron image (LEI) detector was employed for all EDS measurements.

Before analysis, a 1 cm x 1 cm piece of filter was cut and attached to the sample mount using doublesided carbon tape. The sample was coated with approximately 40 nm of gold to render it conductive. A total of 115 particles were analyzed in this manner from a nucleopore filter sample collected between 27 May 10:15 and 28 May 8:15 (PST) at the Down Valley site.

Particle mineralogical classification was obtained by comparing EDS spectra to known mineral reference spectra ²⁻⁴. As determination of particle mineralogy was the sole goal of this method, it was assumed that the semi-quantitative elemental composition output from the EDS analysis was sufficient for our purposes, and no steps were taken to ensure that the elemental composition results were quantitative. Pure minerals were defined as those containing only Si (quartz), only Ca (calcite), only C and S at an approximate 1:1 ratio (gypsum), only Ca and Mg (dolomite), or only Al, Si and one of either Ca, Na, or K (feldspar). Feldspar was further divided into plagioclase and orthoclase sub-classifications based on the presence of Na or Ca (plagioclase) or the presence of K (orthoclase) in the EDS spectrum. Note that orthoclase is sometimes referred to as K-feldspar. Finally, amphiboles and clay minerals were identified through comparison with reference spectra.

References

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