

Publication

Regionally sourced bioaerosols drive high-temperature ice nucleating particles in the Arctic

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Primary biological aerosol particles (PBAP) play an important role in the climate system, facilitating the formation of ice within clouds, consequently PBAP may be important in understanding the rapidly changing Arctic. Within this work, we use single-particle fluorescence spectroscopy to identify and quantify PBAP at an Arctic mountain site, with transmission electronic microscopy analysis supporting the presence of PBAP. We find that PBAP concentrations range between 10; -3; -10; -1; L; -1; and peak in summer. Evidences suggest that the terrestrial Arctic biosphere is an important regional source of PBAP, given the high correlation to air temperature, surface albedo, surface vegetation and PBAP tracers. PBAP clearly correlate with high-temperature ice nucleating particles (INP) (>-15 °C), of which a high a fraction (>90%) are proteinaceous in summer, implying biological origin. These findings will contribute to an improved understanding of sources and characteristics of Arctic PBAP and their links to INP.

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