

Variations in mineralogy of dust in an ice core obtained from Northwestern Greenland

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Snow and ice on glaciers and the ice sheet in the Arctic contain windblown mineral dust derived from local sediments as well as distant deserts. Dust deposited on the ice sheet in the past can be obtained by ice core drilling, and the variations in its sources and transportation processes can be reconstructed by particle analysis of ice cores. In this study, we analyzed morphology and surface chemistry of mineral dust particles in an ice core drilled in Northwest Greenland with Scanning Electron Microscope (SEM, QUANTA FEG 450) and Energy Dispersive X-ray Spectrometer (EDS).

The ice core was drilled at the SIGMA-D site (N77°64', W59°12' [1]) of 2100 m a.s.l. in 2014. The length is 222.72 m and the estimated age at 113 m depth is 350 years before present. The ice samples were collected every five years in plastic bottles and freeze dried on a polycarbonate filter to concentrate micro-particles. Then, the filter was coated with platinum (Pt) for SEM analysis.

SEM-EDS analysis revealed that the silicate minerals were most dominant insoluble particles in the ice core. Here we report the temporal variations in size distributions and compositions of the minerals.

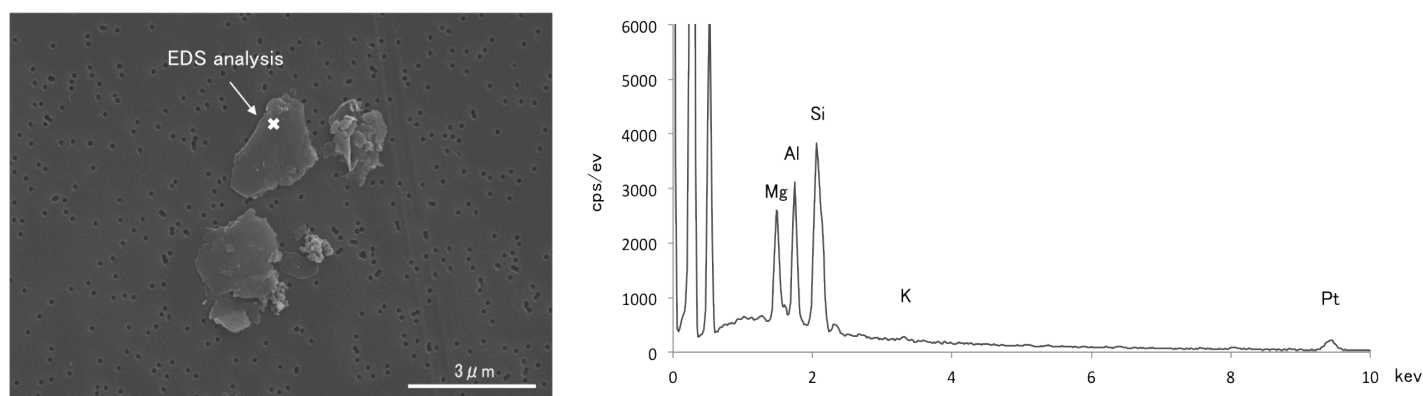


Figure 1. SEM image and EDS spectra of mineral dust in SIGMA-D ice core

References

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