[EJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-CG Complex & General

[A-CG38]Science in the Arctic Region

convener:Shun Tsutaki(The University of Tokyo), NAOYA KANNA(Arctic Research Center, Hokkaido University), Shunsuke Tei(北海道大学 北極域研究センター, 共同), Tetsu Nakamura(Faculty of Environmental Earth Science, Hokkaido University)

Thu. May 24, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

The Arctic and circumpolar region is the key area for the study of global change because the anthropogenic impact is projected to be the largest in this area due to the complicated feedback processes of the nature. A number of international and interdisciplinary research projects have been conducted for the studies on the land-atmosphere-ocean system. In order to understand the feedback processes occurring in the Arctic and to project the global warming in the future, we need to establish the intense observational network and to exchange the knowledge and information by combining the different scientific communities under the common interest of the Arctic. The objectives of this session are 1) to exchange our knowledge on the observational facts and integrated modelling and 2) to deepen our understanding on wide range of natural sciences related to the Arctic and the circumpolar region. Studies on humanities, social sciences, and interdisciplinary fields are also welcomed.

[ACG38-P22]Variations in composition of mineral dust in an ice core obtained from Northwestern Greenland Ice Sheet

*Naoko Nagatsuka[1], Kumiko Goto-Azuma[1,2], Hideaki Motoyama[1,2], Sumito Matoba[3], Koji Fujita[4], Tetsuhide Yamasaki[5], Yukihiko Onuma[6], Masahiro Minowa[3], Teruo Aoki[7], Motohiro Hirabayashi[1], Dallmayr Remi[8]

(1.National Institute of Polar Research, 2.SOKENDAI (The Graduate University for Advanced Studies), 3.Institute of Low Temperature Science, Hokkaido University, 4.Graduate School of Environmental Studies, Nagoya University, 5.Avangnaq, 6.Institute of Industrial Science, University of Tokyo, 7.Graduate School of Natural Science and Technology, Okayama University, 8.AWI)

Keywords:ice core, Greenland, Scanning Electron Microscope (SEM), mineral composition

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’) 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.

The SEM observation revealed that the mean size of mineral dust in the SIGMA-D ice core ranged from 1-3μm, which is similar to that of the other Greenland ice core dust that seems to be derived from distant deserts. This suggests that the SIGMA-D ice core contained mainly long–range transported wind-blown mineral dust. The EDS alalysis also revealed the ice core contained mainly silicate minerals, especially clay minerals, that showed compositional variation among the samples. For example, Quartz and Feldspar contents were three times higher in 1935-1950 compared with the other periods. Furthermore, the variation

trend also differed among the minerals. The trend of micas/illite, chlorite, and feldspar were similar to each other, but different from kaolinite. The two type of minerals were formed by different weathering processes. These results indicate that the ice core dust was likely derived from different sources in different period.