

グリーンランド北西部で採取されたフロストフラワーの化学成分

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Chemical compositions of frost flower at Siorapaluk in northwestern Greenland

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Frost flowers (FF) are formed on new and thin sea ice by water vapor sublimation under low temperature. Recent studies showed that FF was main source of salt aerosols in polar region and could affect the interpretations of ice core studies, and that FF played a role of releaser of halogen, which could decompose ozone in troposphere (e.g. Rankin et al., 2002). However, the studies about chemical compositions of FF are not enough because of the difficulty of approaching of observation sites. We conducted a field observation at Siorapaluk, northwestern Greenland from February to March in 2014. We collected snow and aerosol samples on sea ice in front of Siorapaluk. We also measured meteorological conditions by an auto weather station near Siorapaluk from December 2013 to April 2014. In this presentation, we report chemical compositions of FF and concentration processes of sea salt during growing of FF.

FF and brine on sea ice surface were collected into clean polyethylene bags with a clean stainless sampler. The collected samples were melted in ambient temperature and transferred into clean polypropylene bottles, and transported to the Institute of Low Temperature Science, Hokkaido University, and kept frozen until chemical analysis. The concentrations of chemical species were analyzed by an ion chromatography system (Thermo Scientific, ISC-2100) after the samples were diluted in 2000 times with ultrapure water.

Figure 2 shows the concentration factors (CF) and enrichment factors (EF) of sulfate in FF, brine on sea ice surface sea ice, snow and sea water calculated by sodium concentration of sea water. CFs of both of FF and brine were range 1-3.3. EFs of sulfate in FF and brine were ranged 0.14-1.2 and 0.35-1.7, respectively. These values were comparable to values reported by previous studies. We would like to discuss the relationship between the variation of EF and growth level of FF here.

References

Rankin, A. M., and 2 others, Frost flowers: Implications for tropospheric chemistry and ice core interpretation, *J. Geophys. Res.*, 107(D23), 4683, doi:10.1029/2002JD002492.

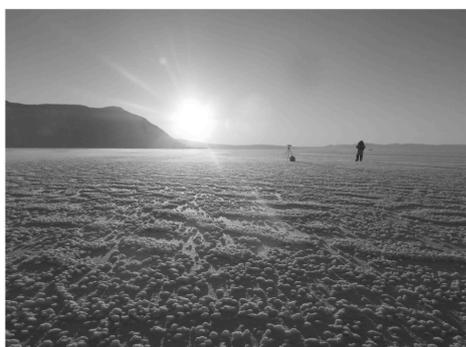


Figure 1. Photograph of sampling site

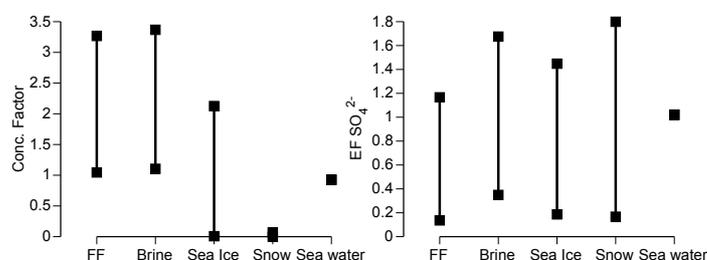


Figure 2. Concentration factors and enrichment factors of sulfate in FF, brine, sea ice, snow and sea water.