

## Analysis of insoluble particles in the ice core from south-east dome, Greenland

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The southeastern dome (SE-Dome) region of Greenland ice sheet has the highest accumulation rate in the domes of the ice sheets (about 1.01 w.e. m/yr). On May 2015, we drilled a 90.45 m ice core in the SE-Dome region (67.18°N, 36.36°W). The SE-Dome ice core has characteristics of high precision dating with a timescale of  $\pm 2$  months[1] and enables to reconstruct recent 60 years environment with seasonal resolution. In addition, chemical compounds have been well preserved in the ice core without post-depositional effect[2]. The non-sea salt (nss)  $\text{Ca}^{2+}$  flux of the SE-Dome ice core was nearly constant from 1957 to 2000, but then increased till the present. The relatively high nss- $\text{Ca}^{2+}$  fluxes after 2000 may link to increase a contribution from local source, such as an increase in land-area exposure around the southeastern Greenland coast. The exposure land-area become a potential emission region of insoluble particles, called dust. In this study, we measure insoluble particles in SE-Dome ice core and reconstruct environment in 60 years with seasonal resolution. Number, mass concentrations, and size distribution of insoluble particles were measured using a Multisizer<sup>TM</sup>3 Coulter Counter (Beckman Coulter, USA) with 30  $\mu\text{m}$  diameter aperture tube (size ranges: 0.662-18.0  $\mu\text{m}$ ). The results show that number and mass concentrations of insoluble particles decreased from 1960s to early 1990s and then increased till the present. The large particle volume rate more than 2  $\mu\text{m}$  in a diameter increased from 1957 to 2014. From these results, anthropogenic insoluble particles decreased in the recent 60 years, and the source of dust has been changed from relatively long to short transportation in the recent 60 years. The mass and nss- $\text{Ca}^{2+}$  concentrations show a noticeable peak in August 2003. Back trajectory analysis shows that the month of August 2003 has the unique air mass transportation along the northeastern Greenland coast, where is mainly exposure land area. Also, the month of August 2003 is the highest mean annual air temperature at the nearest town of Tasiilaq, east Greenland in the recent 60 years, indicating snow/ice at coastal area has been melted and the land have been more exposing. From these reasons, the noticeable peak in August 2003 is probably caused due to both of dust source and transportation processes.

### References

- 1) Furukawa et al., 2017 Journal of Geophysical Research: Atmospheres, 122, 10,873–10,887.
- 2) Iizuka et al., 2018 Journal of Geophysical Research: Atmospheres, 123.

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