

Post-depositional alteration of major ions under different accumulation environment in Antarctica

HOSHINA, Yu^{1*} ; FUJITA, Koji¹ ; IIZUKA, Yoshinori² ; MOTOYAMA, Hideaki³

¹Nagoya University, ²Institute of Low Temperature Science, Hokkaido University, ³National Institute of Polar Research

Major soluble ions and water stable isotopes are important for reconstructing paleo-environment and atmosphere circulation. It is also known that ion and isotope signals are modified after deposition if firn or ice core samples are analyzed at high temporal resolution such as seasonal scale. In inland Antarctica, we revealed that low accumulation rates have resulted in significant post-depositional modification of ions and isotopes due to long time exposure of snow near the surface.

We further investigated relation between major ion concentration and accumulation rate using a several snow pits and firn cores taken from east and west Antarctica. To exclude the geographical factor (east or west), we analyzed correlations with ions against oxygen stable isotope. Correlations of sea salt against oxygen stable isotope are gradually changed from no correlations under higher accumulation sites near coast to more negative correlations under dry environment in inland. On the other hand, correlations of MSA (methanesulfonic acid) against oxygen stable isotope rapidly are changed from positive to negative correlations at $100 \text{ kg m}^{-2} \text{ a}^{-1}$ of accumulation sites. Those different trends suggest different mechanisms of post-depositional modification for these ion species.

Keywords: Antarctica, ice core