

Inconsistent relations among water stable isotope in Antarctic snow under different accumulation environments

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

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

Water stable isotopes and major soluble ions are important for reconstructing paleo-environment and atmosphere circulation. It is also known that ion and isotope signals are modified after deposition if firm or ice core samples are analyzed at high temporal resolution such as seasonal scale.

We compared oxygen isotope, major ions and accumulation rate in shallow ice cores and snow pits from Antarctica with highly temporal resolution data. We showed seasonal cycle of oxygen isotope and major ions were surely preserved at sites over the threshold of accumulation rate with calm wind condition. In order to analyze the samples widely collected from east and west Antarctica, we calculated correlation coefficients of annually averaged major ions to oxygen isotope and then compare with accumulation rate among which the accumulation rate highly correlates. The correlations of most ions change from no correlation to negative one with decrease of accumulation rate. The negative correlations in inland Antarctica could be formed by inconstant accumulation due to low but larger inter-annual variability. The relations among major ions and oxygen isotope may not be those reflecting climatic footprint but be formed as a unique signal in the extremely arid environment.