



## **Strong post-depositional changes of snow isotope content as observed in laboratory experiments: An implication for ice core studies**

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Isotopic composition of ice cores recovered from polar ice sheets is a commonly accepted reliable proxy of paleo-temperature. Detailed measurements of deuterium and oxygen 18 content in deep firn and ice layers has allowed reconstructing the past climate over 120,000 years in Greenland and about 800,000 years in Antarctica. However, isotopic-temperature calibration is related to several assumptions, which makes the absolute magnitude of the reconstructed temperature somewhat uncertain. In particular, more and more evidences appear that isotopic composition of ice deposits has been altered from its initial value due to the post-depositional (PD) processes in upper snow thickness, which is also supported by theoretical considerations and scarce laboratory experiments. In this work we present the results of recent laboratory experiments carried out at Institute of Low Temperature Science (Hokkaido University, Sapporo, Japan). It is shown that due to mass and isotope exchange with the atmosphere, the isotopic content of snow cover becomes heavier. As expected, this isotope enrichment strongly depends on involved temperature. Even for temperature as low as  $-35^{\circ}\text{C}$  strong isotope alteration has been detected. It is also shown that, for a given conditions of air ventilation in the snow thickness, the PD changes may be approximated as a linear function of relative snow mass loss due to evaporation. Possible implications are discussed of the observed PD effects for the paleo-climate studies based on ice core isotope data.

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