

Variation trend of ^{17}O -excess in an Arctic ice core

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Ice cores obtained from glaciers and ice sheets are important archives for reconstructing changes in the paleoclimate. The most important climate changes, such as the variation in temperature, precipitation, and the hydrological cycle, are reconstructed from stable water isotope ratios ($\delta^{18}\text{O}$, δD , and a second-order parameter, the d-excess, defined as $\text{d-excess} = \delta\text{D} - 8\delta^{18}\text{O}$) measured in ice cores. With the improvement of water isotope analyzers, the ability to measure $\delta^{17}\text{O}$ in water with high precision provided another second-order parameter, the ^{17}O -excess, defined as $^{17}\text{O-excess} = \ln(\delta^{17}\text{O}+1) - 0.528 \ln(\delta^{18}\text{O}+1)$. Previous studies reported that ^{17}O -excess in polar snow is mainly controlled by the relative humidity in the water vapor source region, therefore expected as a new proxy of past climate change. However, at the present, there are few studies of ^{17}O -excess in ice core, and therefore an understanding of variation factor of that is incomplete. In this study, we analyzed $\delta^{17}\text{O}$ and ^{17}O -excess in an ice core which was drilled in Alaska. We also discussed the variation factors of those associated with environmental change.

Keywords: ice core, Arctic region, ^{17}O -excess