

Triple oxygen isotopes of water from the Dome Fuji ice core, Antarctica: Implications for humidity changes over glacial cycles

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Stable isotopes of water preserved in the polar ice cores provide important earth's climatic history over glacial interglacial cycles. In addition to the use of either deuterium ($^2\text{H}/^1\text{H}$) or oxygen ($^{18}\text{O}/^{16}\text{O}$) isotope ratios, a combined use of these isotopes has shown the changes in ocean surface temperature in the moisture source for polar precipitation. However, oxygen-17 analyses of water samples are very limited due to the technical difficulties of precise measurement. Recently, theoretical works suggested that the usefulness of water ^{17}O as a unique tracer of relative humidity changes at the moisture source ocean.

Here, we developed the new simple method to measure oxygen-17 ratio ($^{17}\text{O}/^{16}\text{O}$) of water and measure the triple isotopes of water (^{16}O , ^{17}O , ^{18}O) in the deep ice core drilled at the Dome Fuji station, Antarctica. The ^{17}O -excess, which is the deviation of the measured ^{17}O from the mass-dependent relationship, shows the glacial-interglacial changes around the MIS 9.3.