ABSTRACT

In a warming world, estimates of how much the West Antarctic Ice Sheet will contribute to future sea level rise, are important to make projections for future climate. The coastal RICE ice core from the Ross Ice Shelf in West Antarctica can help to improve our understanding of, among others, what drives ice sheet retreat and collapse.

The residence time of δ^{18}O in the atmosphere of 1200-2000 years is significantly larger than the one year time scale of interhemispheric mixing, so δ^{18}O is a global marker. δ^{18}O bears a strong signature of orbital precession and has therefore been used to orbitally tune different ice core records.

In this master project, we finalize and test an existing experimental set-up for measuring atmospheric δ^{18}O conserved in bubbles in ice cores.

We measure δ^{18}O for 18 different depths in the oldest part of the RICE ice core. Our measurements are superimposed on the Siple Dome ice core δ^{18}O record in order to find the age of the gas. An a priori dating is performed using the RICE measurements that fit with well-defined peaks in the δ^{18}O record from the Siple Dome core to constrain the other measurement points in time intervals.

No time scale can be determined for the oldest 30 m of the RICE core because there are too few data points to constrain our measurements to a certain time interval. The a priori time scale is improved for the interval 696.2 m - 728.3 m using methane data from the RICE core. Our time scale dates 728.3 m to 36,000 years BP.