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On the way to understand past atmospheric CO_2 fluctuations using $\delta^{13}CO_2$ measured on ice cores

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To understand the processes driving the global carbon cycle, as well as to quantify the fluxes between its major reservoirs, the atmospheric $\delta^{13}CO_2$ signal of air trapped in Antarctic ice cores bears crucial information.
Using a sublimation technique coupled to a GC-IRMS system to simultaneously measure $\delta^{13}C$, $\delta^{18}O$, CO_2 as well as the N_2O mole fractions, we are able to quantitatively extract air, trapped in bubble, clathrate and bubble/clathrate transition ice, which is not yet possible with mechanic extraction devices. A gas-chromatographic separation prior to the measurement excludes isobaric interferences (N_2O, drill fluids). Our raw data processing software allows user specific peak integration opportunities as well as more precise N_2O integration, leading to precisions of $0.06‰$ on $\delta^{13}C$.
In detail, we retrieved the stable carbon isotope changes of CO_2 during Marine Isotope Stage 5.5 from the EPICA Dome C ice core, to examine observed CO_2 variability during interglacial periods, as well as in between glacial and interglacial intervals, by comparing with previous $\delta^{13}CO_2$ data from the Holocene (Inderm"uhle et al. 1999) and Termination I (Lourantou et al. 2008, submitted).