



Exploring centennial-scale CO₂ reconstruction in the last interglacial

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Ice cores represent the only direct atmospheric archive to reconstruct past CO₂ atmospheric levels by analyzing ancient air trapped in bubbles in the ice. While CO₂ concentrations have been documented over the last 800,000 years (800 kyr), insufficient resolution in many intervals precludes uncovering fine structure on the sub-millennial scale (Lüthi et al 2008). Restricted ice availability and difficulties with traditional CO₂ dry extraction techniques typically inhibit high-resolution data. In this paper, we present a new (preliminary) CO₂ dataset for Marine Isotope Stage 5 from EPICA Dome C improving the available resolution by a factor of three. Discrete sampling with our Centrifugal Ice Microtome (CIM; Bereiter et al 2013) achieved ± 1 ppm in precision and approximately 250 yr in resolution over the interval 104-135 kyr BP. The reconstruction shows a remarkably stable interglacial period between 127 and 115 kyr at 277 ppm and hints at potentially rapid CO₂ variations during Termination II. Future measurements will increase the resolution of the dataset to 100 yr, delivering a CO₂ record of significant value for our understanding of the last interglacial climate conditions and its relationship with the Holocene (Marcott et al 2014).