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## Utilizing melt layers in ice cores for climate reconstruction – a mission (im)possible?

### Content

Rising temperatures are an increasing issue for ice core science around the world including the (sub-)polar regions, because (near-)surface melt events are occurring more frequently and more extensively. These melt phases adversely affect the preservation of classic ice core proxies and pose significant uncertainties to ice-core derived climate reconstruction. For sound and comprehensive use of ice cores as climate archives, it is essential to understand the limitations and potential of melt-affected ice cores.

Here, we aim to give a brief overview of the scientific status quo about melt-affected ice cores and how melting affects both physical structure and chemistry. Furthermore, we present approaches of varying spatial resolution used to analyse structural and chemical ice core proxy records. We compare the capabilities of methods like continuous flow analysis, laser ablation inductively-coupled plasma mass spectrometry, line scanning, and microfocus X-ray computer tomography to assess the impact of melting and refreezing on shallow ice core samples from multiple (sub-)Antarctic sites.

**Primary author:** MOSER, Dorothea Elisabeth (British Antarctic Survey & Department of Earth Sciences, University of Cambridge)

**Co-authors:** HOFFMANN, Helene (Department of Earth Sciences, University of Cambridge); FREITAG, Johannes (Alfred-Wegener-Institut, Helmholtz-Zentrum für Polar- und Meeresforschung (AWI)); TETZNER, Dieter (British Antarctic Survey); Prof. WOLFF, Eric W. (Department of Earth Sciences, University of Cambridge); THOMAS, Elizabeth R. (British Antarctic Survey)

**Presenter:** MOSER, Dorothea Elisabeth (British Antarctic Survey & Department of Earth Sciences, University of Cambridge)

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