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A high-resolution continuous-flow analysis system for broad-spectrum analyses of polar and non-polar ice cores

Content

We present the British Antarctic Survey (BAS) updated and optimised continuous-flow analysis (CFA) system along with examples of high-resolution data to evidence our capabilities across a broad-spectrum of analyses. Our CFA setup includes the capability for the continuous analysis of stable water isotopes ($\delta^{18}\text{O}$ & δD); cavity ring-down spectroscopy, CRDS); H_2O_2 , NH_4^+ , Ca^{2+} with fluorometry; electrolytic conductivity; insoluble particulate size distribution (laser diffraction spectroscopy, LDS); trace elements (inductively-coupled plasma mass spectrometry, ICP-MS); and anions and cations (fast ion chromatography, FIC). The system is also coupled to a CRD spectrometer for the determination of CH_4 concentration. The method has recently been used to analyse ca. 1 km of ice cores, including a new deep ice core (Skytrain Ice Rise), shallow Antarctic ice cores (Palmer, Bryan Coast and Jurassic) and for the first time a mid-latitude mountain ice core. The optimised method will be used to analyse a new Holocene ice core from coastal Dronning Maud Land (to be drilled in 2022/23) as part of the UK-India-Norway Sea Ice and Westerly winds during the Holocene in coastal Antarctica (SIWHA) project.

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