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Continuous flow analysis of the Mount Brown South ice core

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The Mount Brown South (MBS) ice core is an approximately 300-meter-long ice core, drilled in 2016-2017 to the south of Mount Brown, Wilhelm II Land, East Antarctica. This location in East Antarctica was chosen as it produces an ice core with well-preserved sub-annual records of both chemistry and isotope concentrations, spanning back over 1000 years. MBS is particularly well suited to represent climate variations of the Indian Ocean sector of Antarctica, and to provide information about regional volcanism in the Southern Indian Ocean region.

A section of ice spanning the length of the MBS core was melted as part of the autumn 2019 continuous flow analysis (CFA) campaign at the Physics of Ice, Climate, and Earth (PICE) group at the University of Copenhagen. During this campaign, measurements were conducted for chemistry and impurities contained in the ice, in addition to water isotopes. The data measured in Copenhagen include measurements of H₂O₂, pH, electrolytic conductivity, and NH₄⁺, Ca²⁺, and Na⁺ ions, in addition to insoluble particulate concentrations and size distribution measured using an Abakus laser particle counter.

Here, we present an overview of the CFA chemistry and impurity data, as well as preliminary investigations into the size distribution of insoluble particles and the presence of volcanic material within the ice. These initial chemistry and particulate size distribution data sets are useful in order to identify sections of the MBS core to subject to further analysis to increase our understanding of volcanic activity in the Southern Indian Ocean region.