



## **Impurity measurements of snow tubes while in the field- a light weight in situ analysis (LISA) box**

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In ice cores continuous flow analysis (CFA) are often used to measure impurities, such as insoluble dust, conductivity and ions by means of fluorescence or absorption techniques after transport from the field to the laboratory. In such a system the ice core is melted on a melt head that separates the potential contaminated outer section from the untouched inner section. The inner melt water stream is then used for high resolution measurements of chemical impurities. However for fragile firn and snow core the transport from the field to the laboratory compromises the integrity of the samples.

Here we present a novel developed Light In-Situ Analysis (LISA) - Portable Continuous Flow Analysis (CFA) box for determining chemical impurities in snow and firn directly, while still in the field. A preliminary version of the box has been tested successfully on 2 meter snow cores at the EastGRIP ice core drilling site in 2017 in Northeast Greenland at  $-22^{\circ}\text{C}$ . This proof-of-concept device demonstrates that successful measurements can be conducted under open-field conditions to constrain conductivity and thus annual accumulation, but only one parameter (conductivity) was continuously measured.

The box have been further optimized to include also opportunities for two sets of fluorescence measurements such as eg. peroxide, calcium or ammonium. In low accumulation sites in Greenland such proxies can be used to identify annual layers in the snow pack. In addition the density of the snow cores can be determined by monitoring the melt speed in combination with the energy used on melting. The two sets of measurements combined can provide the annual accumulation.