Experimental Master of Science project at CIC

**Development of a technique for determination of sulphate (SO\(_4^{2-}\)) in ice cores by optical colourimetry**

Sulphate is one of the most reliable indicators of volcanic activity preserved in ice cores. Volcanic eruptions from both the historical and pre-historical periods have been identified in ice cores from Antarctica and Greenland, offering a means to synchronise polar ice cores as well as deduce whether particular volcanic eruptions originated in the poles or equatorial regions. While sulphate can be measured by Ion Chromatography (IC) or Continuous Flow Analysis (CFA) absorption-spectroscopy techniques, these have various undesirable characteristics: they are either time-consuming and of low-resolution (IC) or they are difficult to implement, unstable and subject to interferences (CFA). Instead, colourimetry may offer a way of achieving reliable, high resolution determination of sulphate concentrations in melted ice core samples.

This project involves the investigation and implementation of the most efficient, sensitive and reliable means of producing a colourimetric reaction between sulphate ions and indicator dyes, and then evaluating and recording the signal. Predominantly chemistry and physics skills will be required, but the project will also involve interfacing optical spectrometers and software control programs.

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