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Analysis of soluble chemistry in the NGRIP ice core

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Chemistry in the NorthGRIP ice core [1] covering the ice age has been analysed using three different methods: Continuous Flow Analysis (CFA) [2], Electrical Conductivity measurement (ECM) [3] and Ion Chromatography (IC). As these methods were used on the same ice sample, complementary analyses and comparisons of different data records were possible, revealing a wealth of information about the content of the atmosphere during the last glacial period.

As expected, the results are correlated to the climatic variation that characterised this glacial period, i.e. to the succession of cold and mild periods. During the stadial events (cold periods), a high level of dust, due to an increased of the wind pattern, influenced severely the observations.

References

[1] Dahl-Jensen, D. et al. (2002) *Annuals of Glaciology.* **35,** 1-4.

[2] Röthlisberger, R et al. (2000) *Environmental Science and Technology* **34** (2), 338-342.

[3] Hammer, C.U (1980) *Journal of Glaciology* **25** (93), 359-372.

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The timespan of the Bølling-Allerød period in the GRIP ice core

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By high-resolution measurements of delta deuterium it is possible to make a better estimation of the length of the Bølling-Allerød period (~14000 years BP) which is found at a depth of ~1700 meters in the GRIP (Greenland Ice Core Project) ice core.

A total of 22 meters of ice has been sampled with a resolution of 1 cm and has been analyzed for the relative abundance of stable hydrogen isotopes on a continuous-flow Isotope Ratio Mass Spectrometer (CF-IRMS) configured for chromium reduction technique. The CF-IRMS method allows analysis of sample sizes as small as 0.3 microliter.

As the isotope ratio ($^1H/^2H$) in the precipitation is temperature dependent, winter and summer layers can be distinguished. The seasonal signal in the deuterium profile along the ice core can be used for annual counting and dating of the climatic periods which are observed in the ice core. However, diffusion in the firn and ice damps the annual amplitude of the deuterium signal. Reconstruction of the initial signal has been done by deconvolution.

Compared to the more commonly used delta^{18}O, the method of delta deuterium has a major advantage of less damping of the yearly signal due to less diffusion in the firn of molecules containing ^2H compared to molecules containing ^{18}O.

The dating is performed by counting annual layers in the isotope signal as well as in high resolution records of Ca and NH_4 ions in the melted ice. By including dust, Na and NO_3 data from the NorthGRIP ice core a more precise dating can be achieved.