Geophysical Research Abstracts, Vol. 7, 09994, 2005
SRef-ID: 1607-7962/gra/EGU05-A-09994

A tephra layer record for 36-10ka BP (calendar ice core age) of two Greenland ice cores

A. K. Mortensen (1), M. Bigler (2), K. Grönvold (1), S. Johnsen (2), JP Steffensen (2)

(1) Nordic Volcanological Centre, University of Iceland, Reykjavik, Iceland, (2) Department of Geophysics, University of Copenhagen, Denmark

The Greenland ice cores represent continuous and well-dated climatic records, extending back to the last interglacial, the Eemian. Sulphate originating from volcanic eruptions is deposited on the Greenland ice sheet leaving a detailed record of volcanic eruptions in the ice.

We have looked for tephra associated with distinct sulphate peaks from two time intervals (Interstadial 7 to Greenland Stadial 5 and the Last Glacial Termination) covering a period from 36-10ka BP (calendar ice core years) in the NGRIP ice core. Tephra was retrieved from 44 samples within these two sections. Major element microprobe analysis of the tephra layers has provided the basis for assessing possible volcanic region or volcano of origin.

The samples were collected from two periods in the ice core that are characterized by several rapid climatic changes. The tephra layer record thus allows us to look into possible relationships between eruption type, origin and the subsequent climatic impact left in the ice core at both stadial and interstadial conditions. Additionally, the frequency of tephra layers in the ice core reflects the level of volcanic activity primarily in Iceland during rapid climatic changes.

With outset in the tephrochronology of the NGRIP ice core, the GRIP ice core has been selectively screened for tephra across the Last Glacial Termination. Geochemical comparison of tephra from the two cores shows positive correlation between six layers, among which are Saksunarvatn and Vedde Ash. The GRIP ice core site is located 300km to the south of the NGRIP ice core site. The correlation of tephra layers between these two ice core sites demonstrates the wide dispersal of distal ash plumes and the usefulness of tephrochronology for stratigraphic correlation.