

Metadata Details

Title

Drilling for Polar Continental Ice-cores Between Nunataks Veteheia and Tallaksenvarden in East Antarctica.

Science Keywords

Category	Paleoclimate
Topic	Cryosphere
Expedition Year	1995-1996
ISO Topic	Geodesy

Summary

Abstract

The palaeoclimatic record of past several thousand years is preserved in the Antarctic ice sheet as atmospheric air, gases, pollen, dust, volcanic emissions, pollutants. The $\delta^{18}O$ content of ice shows a general linear relationship with prevalent surface air temperature, thus it is possible to establish a palaeotemperature vs isotope curve. It is necessary to recover continuous ice cores from deeper levels to unravel this palaeoclimatic information. Ice core drilling was done in the 15th Indian Antarctic Expedition in 1996. The effort was successful in touching the bedrock of the glacier at 76 m depth, drilling through its entire thickness. Brittle core was encountered near the bedrock. In the same polar season, a second borehole was drilled at a higher elevation in the continental interior, which generated continuous ice cores upto a depth of 84 m. Core from both the boreholes has been logged for physical parameters. The average density of the core from the first borehole is 0.89 gm/cm³

Purpose

About 98% of the continent of Antarctica is covered by ice. Within the ice, in the form of air bubbles, inclusions and isotopes is preserved the palaeoclimatic record of past several thousand years as atmospheric air, gases, pollen, dust, volcanic emissions, pollutants etc. The $\delta^{18}O$ content of snow shows a general linear relationship with surface air temperature, making it possible to establish a temperature-isotope equation. Again, since the temperatures in polar regions reflect the pronounced changes in seasonal patterns, it is possible to find out if the snow fell in summer or winter. Thus, by counting the thermal layers, it becomes possible to date the ice from depths. To unravel all this palaeoclimatic information, it is necessary to raise ice core samples from deeper levels of the glaciers or ice sheet. A small capacity, cable suspended, dry-electromechanical, Japanese drilling machine was used during the 15 expedition in 1996. Two boreholes were drilled in polar continental ice.

Data Center