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ANALYSIS OF TRACE ELEMENTS IN THE BHQ ICE CORE, LAW DOME, ANTARCTICA

(Abstract)

by

Liu Yun-gang, Zhang Yun-hui, Li Gui-qun and Xiao Lun

(Institute of Atomic Energy, P.O. Box 275-58, Beijing, People's Republic of China)

and

Xie Zi-chu

(Lanzhou Institute of Glaciology and Geocryology, Academia Sinica, Lanzhou, Gansu, People's Republic of China)

ABSTRACT

Trace elements in ice samples taken from Law Dome, Antarctica, were analysed, using an instrumental neutron-activation analysis technique. A Jupiter multi-channel analyser – computer system coupled to a Ge(Li) detector was used for the acquisition of γ-spectra, and for data reduction. "Blanks" in water and in nitric acid, which were used in pre-concentration and sample transfer, were also analysed. To check the validity of this analytical procedure, a U.S. Environment Protection Agency water standard for trace elements was analysed. The observed values agreed with the certified values.

The results (in ppb) of eight elements are:

Na	209	Mn	0.42	Mg	26	Fe	14
Sc	0.0017	Co	0.028	Al	9.6	Se	0.02

The enrichment factors for these eight elements relative to the Earth's crust were calculated. These elements can be subdivided into three groups or sources according to their enrichment factors. The variations in elemental concentrations with depth show no positive tendency towards a systematic increase or decrease over the past 5000 years.

THE VARIATION IN THE ICE SHEET OF MIZUHO PLATEAU, EAST ANTARCTICA

(Abstract)

by

Shinji Mae *, Fumihiko Nishio **, Hirokazu Ohmae **, Shuhei Takahashi ***, Masayoshi Nakawo * and Kunio Kawada ****

* (Department of Applied Physics, Faculty of Engineering, Hokkaido University, Sapporo 060, Japan)

** (National Institute of Polar Research, 9-10, Kaga 1-chome, Itabashi-ku, Tokyo 173, Japan)

*** (Kitami Institute of Technology, Koen-cho 165, Kitami 090, Japan)

**** (Faculty of Science, Toyama University, Toyama 930, Japan)

ABSTRACT

The Japanese Antarctic Research Expedition (JARE) has conducted glaciological studies on Mizuho Plateau since 1981. We have already reported that the ice sheet flowing from Mizuho Plateau into Shirase Glacier is thinning at a rate of about 70 cm/year and that the profile of the distribution of basal shear stress is similar to that of surging glaciers.

A 5 year glaciological programme on Mizuho Plateau and in east Queen Maud Land is now being carried out and we have obtained the following new results:

(1) The ice sheet in the down-stream region (where ice elevation is lower than about 2400 m) is thinning, based on measurements of horizontal and vertical flow velocity, strain-rate, the slope of the ice surface, the accumulation rate and densification of snow.

(2) $\delta^{18}O$ analysis of deep ice cores obtained at Mizuho Station (2240 m a.s.l.) and point G2 (1730 m a.s.l.) shows that $\delta^{18}O$ increased about 200 years ago at Mizuho Station and about 400 years ago at point G2. If we can assume that the increase in $\delta^{18}O$ is caused by the thinning of the ice sheet, then this result means that this thinning propagates to up-stream areas.

(3) Radio-echo-sounding measurements on Mizuho Plateau show that the ice base in the down-stream region is wet. This supports the result described in (1), since the basal sliding due to a wet base causes ice-sheet thinning, as proposed in our previous studies.

In summary, a possible explanation of ice-sheet variation on Mizuho Plateau is as follows: the thinning of the ice sheet, caused by the basal sliding due to basal ice melting, started at Shirase Glacier and has been propagating up-stream to reach its present position. A simple calculation, using flow velocities, shows that the thinning started at Shirase Glacier about 1500–2000 years ago.

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