THE STATE OF MINOR CONSTITUENTS IN THE ANTARCTIC SNOW AND ICE (ABSTRACT)

Satoru Kanamori[1], Nobuko Kanamori[1], Masataka Nishikawa[2], Okitsugu Watanabe[3] and Fumihiko Nishio[3]

[1]*Water Research Institute, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464–01*

[2]*National Institute for Environmental Studies, 16–2, Onogawa, Tsukuba 305*

[3]*National Institute of Polar Research, 9–10, Kaga 1-chome, Itabashi-ku, Tokyo 173*

A preliminary study of the distribution and the state of minor chemical constituents in the test cores from Mizuho Station was made. Samples from 1 m, 5 m, 15 m, 20 m, 25 m, and 90 m depths were used. The melt waters of these samples were filtered through a 0.4 μm Nucleopore filter. The major constituents (Cl, NO_3, SO_4, Na, K, NH_4), formic acid and methanesulfonic acid were determined by liquid chromatography. Total and free Cu and Zn were determined by liquid chromatography with and without oxidative chemical digestion treatment. The difference between them gives organic Cu and Zn.

The results are summarized as follow:

1) Formic acid, methanesulfonic acid and organic Cu and Zn were found down to 90 m depth (about 1300 y b.p.) indicating the stability of these organic substances in the glacier ice condition. The proportion of organic Cu and Zn against the total amounts were significant, as was found at S25 near Syowa Station.

2) At 15–20 m depth (about 200 y b.p.), most constituents showed high levels, suggesting the occurrence of some unusual event.

3) The Cl/Na ratio generally shows a value close to that of sea salt, except for 20 m and 90 m depth. This trend is quite different from that of methanesulfonic acid which keeps a low level in the upper 300 m and increases toward 1300 m. Methanesulfonic acid is reported to originate from dimethylsulfide, which is produced by planktonic activity in sea water, and to show high level in the marine atmosphere over the Southern Ocean. These facts suggest different transportation mechanisms of these substances.