

DISTRIBUTION OF CHEMICAL COMPONENTS BETWEEN  
ATMOSPHERE AND SNOW PHASES IN EAST QUEEN MAUD LAND  
(ABSTRACT)

Satoru KANAMORI<sup>1</sup>, Nobuko KANAMORI<sup>1</sup>, Okitsugu WATANABE<sup>2</sup>  
and Hideaki MOTOYAMA<sup>2</sup>

<sup>1</sup>*Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-01*

<sup>2</sup>*National Institute of Polar Research, 9-10, Kaga 1-chome, Itabashi-ku, Tokyo 173*

It is certain that all chemical components contained in Antarctic ice have been derived from the atmosphere. However, the detailed mechanism of their inclusion into glacier ice is still a subject of research. Comparisons of chemical composition of atmospheric aerosol and falling snow or surface depositing snow have been carried out at the South Pole Station and Antarctic Peninsula areas and good linear relationships have been found, especially in the latter case. But these studies were focused on the behavior of heavy metal elements. Furthermore, the same kinds of studies carried out in Alaska gave a negative conclusion.

The authors studied the relationship between chemical compositions of atmospheric aerosol and fresh drifting snow in 1990-1993 on the Mizuho Plateau and found a loose linear relationship with regard to the most of main chemical species contained in aerosol and snow. The extent to which the linear relationship holds differs among chemical species. Even with such uncertainty, these results suggest a general conclusion that the chemical composition of impurities contained in Antarctic glacier ice is ultimately controlled by surface aerosols.

In 1993-1994, the study was repeated with the expanded survey area from the sea surface to near the Dome Fuji Station. However, this time the linear relationship was much more diffuse than expected from previous studies. Most typically, quite different results were observed by duplicate sampling with time lag of nearly a month, one with a linear relationship and the other without it. These results suggest the necessity of more basic studies of factors determining chemical composition of Antarctic snow and ice for better understanding of the Antarctic ice core.

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