Characteristics of climate and environmental signals with the various time scales from past 720,000 years in Dome Fuji ice core, Antarctica

Hideaki Motoyama (1,2) and Dome Fuji ice core project members (1)

(1) National Institute of Polar Research, Tokyo, Japan (motoyama@nipr.ac.jp), (2) The Graduate University for Advanced Studies, Tokyo, Japan (motoyama@nipr.ac.jp)

Two deep ice cores (DF1: 2503m and DF2: 3035m) at Dome Fuji, Antarctica have the in-depth information of global environmental change from present to the past 720,000 years. We made the data set of major ion concentration, dust concentration and stable isotope ratio which were analyzed 10cm sample every 50cm from 2400m to 3035m using the DF2 core. The age of this depth was covered from 300,000 to 720,000 years before. Using the DF1 core, major chemical species were carried out using 7-10cm ice samples cut out of the 50 cm-long spaced from 0.5 to 2.5m. All data was averaged by every 5 m or every 1,000 years.

The indexes of climate and environment are the following elements; MSA-, Cl-, NO_3-, SO42-, H+ (calculated from pH), Na+, NH4+, K+, Mg2+, Ca2+, ss-Na+, nss-Cl-, nss-SO42-, nss-K+, nss-Mg2+, nss-Ca2+, dD, d18O, d-excess, dust, pH and electrical conductivity. There is a feature in correlation respectively by the climatic stage. dD or d18O which becomes the index of the temperature and the environmental elements (for example, Na+ and Mg2+) indicate the strong negative correlation, but its degree is different depending on the climatic stages.

Deep ice core records are compared with initial conditions (precipitation and surface snow). Time scales of our studies are daily, yearly, millennial-scales and glacial-interglacial cycle. We show the difference of the chemistry of surface snow by the difference of the snow type in the same area.