



Characteristics of basal ice and chemical constituents at Dome Fuji, Antarctica

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The second deep ice coring project at Dome Fuji, Antarctica reached a depth of 3035.22 m during the austral summer season in 2006/2007. The recovered ice cores contain records of global environmental changes going back about 720,000 years.

The borehole measurement was carried out. Rate of heat flow in the ice sheet was calculated using the vertical temperature gradient of the ice sheet and heat conductivity of ice. The deepest part of heat flux using temperature profile was about 45mW/m². Heat flux to the surface in the bedrock was assumed 54.6mW/m² adopted by ice sheet model (P. Huybrechts, 2006). Then the heat flux for basal ice melt was about 10mW/m². This value was equaled to melting of 1.1mm of ice thickness per year. Meanwhile, the annual layer thickness under 2500m was not changed so much and its average was 1.3mm of ice. So the annual layer thickness and melting rate of basal ice was the same in ordering way.

When the ice core drilling depth passed 3031.44m, amount of ice chip more abundant than the cutting chips has been collected. The temperature of basal ice is the pressure melting point. So the liquid water can exist easy there. The water like groundwater infiltrated into the borehole and froze in drilling liquid from 3031.44m to 3033.46m. Under 3034.59m, the subglacial water infiltrated into the borehole and froze in drilling liquid.

The variations of water isotope (¹⁸O and D) and dust in basal ice have no conspicuous change. But the concentrations of Cl ion had interesting behavior. The concentration of Na ion decreased deeper than 3020m, while Cl ion was increased. Further the concentrations of all ions were decreased suddenly deeper than 3034m. The concentration of ions will be decrease in turn according to the solubility of the ion.