

# The full picture of Dome Fuji Deep Drilling Project and its results

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After more than 10 years of preparation, the Japanese glaciological group succeeded in obtaining a deep ice core down to 2503m depth at such an ideal location, Dome Fuji in 1960.

Snow accumulates and sinks down vertically at summits of the ice domes, where horizontal flow is negligible. A deep ice core from the summit of a dome, therefore, records several hundred thousand years deposition in site.

In the present research, the deep ice core, taken in an ideal ice sheet location, is being analyzed in detail, through the cooperation of many researches in various disciplines, throughout all of the depth layers, and the core signals contained in them are being deciphered into environmental information.

In addition, the core signals are being cross-analyzed to determinate the origins of substance, the environments and their transport processes under which they originated, with the aim of recreating the past global environment and climate over more than 340,000 years, covering three glacial interglacial cycles.

Dome Fuji deep ice coring site, is located at 77. 19. 01.S, 39. 42 .12.E with 3810m a.s.l in altitude. 10m depth snow temperature (average annual air temperature) is 57.3, and mean annual net accumulation estimated from 1966 Tritium reference horizon is 32 mm w.e. The ice thickness at the dome summits was measured as 3030m by repeated radio echo sounding in 1996.

The items of basic analyses are: 1) stable oxygen and hydrogen isotope ratio for reconstruction of the paleoclimate change, 2) major anion and cation concentration for study of paleo-geochemical cycle and paleo-environmental changes, 3) micro-particles and trace metals for study of change of terrestrial dust source and the transportation processes as well as volcanic events, 4) trace gases for study of greenhouse effect on climate change involving the variation of biological process, and 5) physical properties for study of air hydrate, cloudy bands, grain size, total air content and so on.

The oxygen isotope composition and hydrogen isotope composition, which are indices of air temperature, were analyzed with time resolution of 50 years. From the relation between the present temperature and isotope composition, the results were converted to air temperature.

From these analysis results, the details of 3 glacial cycle covering the last 340 k-years became clear. The air temperature variations during the 3 glacial cycles have periods of 100 K- years, 40 K-years and 20 K-years, with similar patterns of variation in each case, but it is also clear that the details differ, as follows. The temperature difference between a glacial and a interglacial period is about 8 to 10, and the warmest temperature of the Holocene is 2 to 4 lower than the temperature reached during the last interglacial period.