

Characteristics of micro-inclusions in deep part of Dome Fuji ice core, Antarctica

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Water soluble impurities in a polar deep ice core are the proxies for the past climate over several hundred thousand years. Recently, chronological reliability of water soluble impurities has been considerable interest. There have been many studies of existence of water soluble impurities in the polar ice core. Rempel et al. [2001] suggested the water soluble impurities as acid solution, sulfuric, and nitric acid, displaced by premelting and anomalous diffusion through vein network. Lately, however, the remarkable findings of water soluble impurities as sulfate and nitrate salts in ice were first observed by the micro-Raman spectroscopy [Ohno et al., 2005]. They showed that the difference of chemical compound of salts between the climate period. In the Holocene and the interglacial period of ice include mainly the sodium sulfate and magnesium sulfate. In the glacial period, especially glacial maximum of ice include mainly calcium sulfate, and some of nitrate salts. In this study, we report that the chemical composition, number concentration, spatial distribution of micro-inclusions, average diameter, and chemical composition of micro-inclusions in Dome Fuji deeper ice core, using optical microscope and micro-Raman spectroscopy such are suitable to measure micro-inclusions in none melted ice sample. In shallower depth in our samples, we found that the micro-inclusions in the ice grain as typically a few micrometers in diameter. The number densities and mean diameters of the micro-inclusions found in each sample. On the other hand, in deeper part, we found that the some of micro-inclusions distributed on the grain boundary. From this result, spatial distribution of micro-inclusions in deeper part would change, because of high temperature condition from geothermal heat.