# Change of aerosol chemical composition during the glacial cycle recorded in the Dome Fuji ice core

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[Introduction] Since Antarctica is a convergence region of atmospheric circulation, aerosols originated from various sources on the earth deposit onto the surface of the ice sheet and preserved in the ice layer. The particulate matters in the ice sheet have the important clue for evaluating the past climatic change because the chemical composition of aerosol reflects the environmental change of earth's surface. The 1st ice core obtained from Dome Fuji, Antarctica is recording the information which goes back till the past 340kyr. Until now, analysis of dissolved constituents by using an ion chromatography has principally been performed. However, it is expected that most part of mineral aerosol supplied to an ice sheet is insoluble particles. Therefore, in this study, we measured total (particulate+dissolved) concentration of metallic elements by applying a full-digestion analysis of Dome Fuji ice core, and clarify the change of chemical composition of the mineral aerosol accompanying a climate change.

[Method] The 1st Dome Fuji ice core obtained in 1995-96 was used in this study. Based on the result of oxygen isotope ratio and laser particle counting, the pieces of ice of 5-10 cm thickness were cut from the depth of the termination which shows a rapid climate change. In order to collect the particles in a sample completely, a piece of ice was wholly evaporated to dryness in a Teflon vessel and decomposed by using the microwave acid digestion method with nitric acid and hydrofluoric acid. The total concentrations of Fe, Al, Mn, Mg, Ca, Sr, Ba and Na in the samples were measured by ICP-MS and ICP-AES.

[Results and Discussion] The enrichment factor to the crust (EF) of non-seasalt alkaline-earths, the index of chemical weathering of crust, were close to unity in the glacial periods and increased in the interglacials. While the EF-Mn showed almost the same variation as alkaline earths, the EF-Fe was not increase at all the interglacial periods. Correlation between the EF-nssBa and the EF-nssSr was very good in 94% of the contribution factor. From this result, we consider that Ba and Sr in the Dome Fuji core would be transported through the same chemical weathering process in connection with the climate change. The EF-Mn and the EF-nssBa also showed significant correlation (66% of the contribution factor). It is considered that a part of Mn was transported through the same chemical weathering as Ba, Sr, etc. However, the EF-Fe and the EF-nssBa did not show correlation obviously. This indicates that there is another mechanism in the Fe-enrichment in the core rather than the chemical weathering occurred in alkaline earths and Mn. We observed high correlation between the EF-Fe and the EF-Mn in very small number of samples. This may be due to the occasional mixing of the particles which are enriched in Fe and Mn. Theses results are indicate that the variation of the concentration of metallic elements in the Dome Fuji ice core is recording both (1) the change of the chemical weathering process in earth's surface depending on climate change and (2) the change by sporadic input of cosmic dust, volcanic ashes and etc.