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Field Processing of Ice Cores at Dome Fuji: An Overview of Three Drilling Periods and the Ongoing Third-Phase Project

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At Dome Fuji in East Antarctica, deep ice coring projects have been conducted three times over the past three decades. The first core (DF1) was drilled between 1992 and 1998, reaching a depth of 2,503 m (Watanabe et al., 2003). The second core (DF2), which extended to 3,035 m and nearly reached the ice sheet bed, was drilled between 2004 and 2007 at a location 44 m from the DF1 borehole (Motoyama, 2007). Nearly two decades later, we are currently engaged in the third-phase Dome Fuji ice coring project. The drilling site for this phase is located approximately 4 km south of the previous sites.

Field processing of ice cores refers to the procedures carried out from the time of drilling until the cores are transported to research laboratories in Japan. This includes: (i) creating various core logs and documentation; (ii) preparing and executing operations for storage and transportation, both for shipment to Japan and for local preservation; and (iii) performing essential analyses. These analyses involve documenting properties that must be recorded immediately after drilling, conducting on-site measurements such as dielectric profiling (DEP), and collecting samples for laboratory analyses (e.g., for water isotopes). Additionally, field processing includes cutting, packaging, and storing the cores; loading them onto sledges and transporting them to the coastal area; maintaining and preparing the necessary facilities and equipment; and developing a long-term storage plan for the ice cores in Antarctica.

In this presentation, we provide an overview of the field processing conducted during the three Dome Fuji drilling campaigns, discuss the effective integration of field operations with subsequent full-scale analyses, and introduce the ongoing field processing activities for the third-phase deep ice core drilling project.

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