

## Investigation on candidate area for new deep ice coring at Dome Fuji, East Antarctica, and its future prospect

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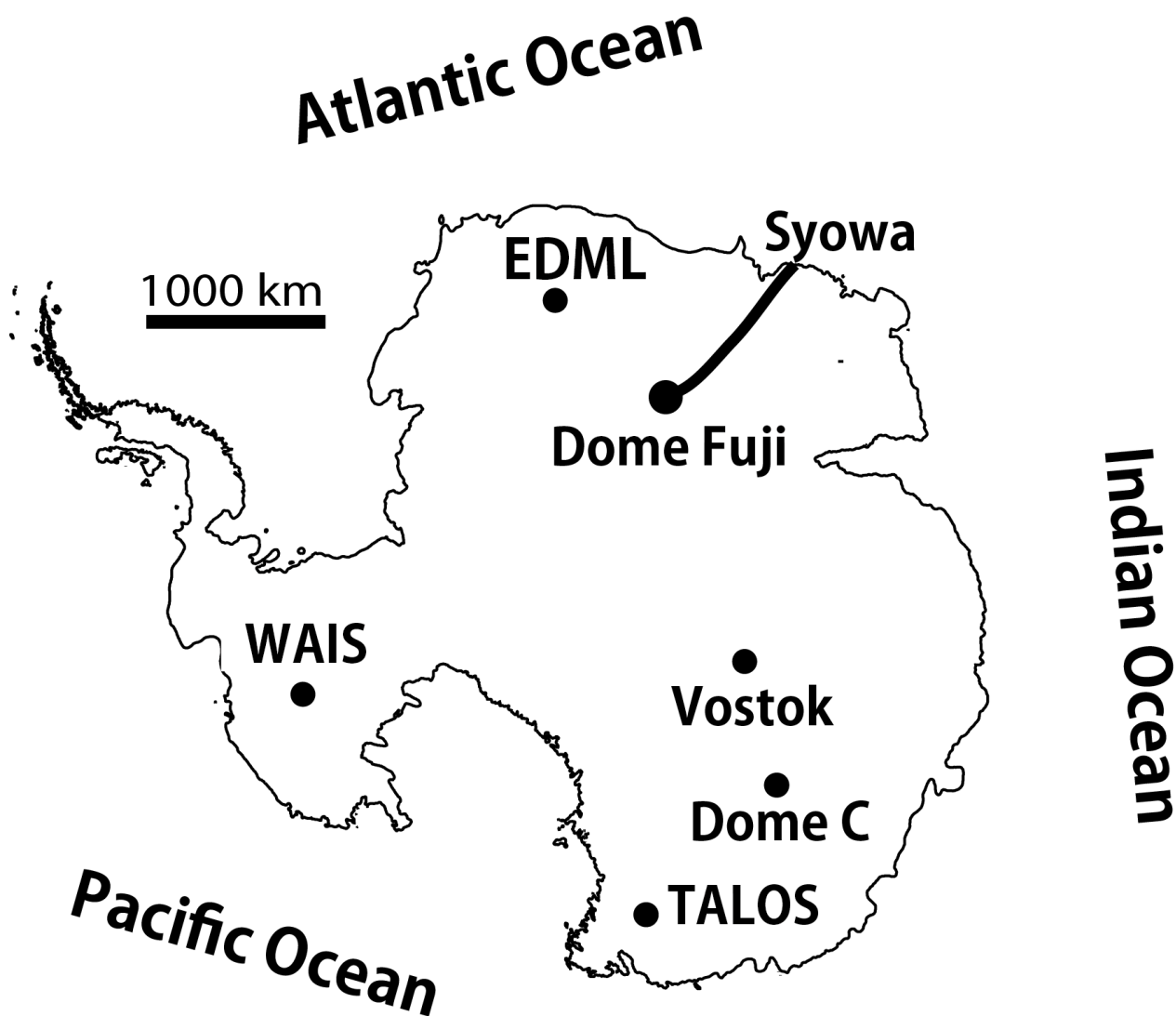
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Introduction: The 9th Japanese Antarctic Research Program (from fiscal year 2016 to 2021) include one of prioritized project, entitled as " Antarctic paleoenvironmental reconstructions for unraveling the Earth system variations". Project leader is Dr. Kenji Kawamura. A main purpose of this project is to reconstruct histories of environmental changes in the Antarctic, and to elucidate roles of the Antarctic in global climatic changes. As one of the major programs, we will recover histories of the environmental changes in the Antarctic within a timescale of the quaternary. We aim to carry out: (i) investigations on candidate area for new deep ice coring at Dome Fuji, East Antarctica, for recovering ice cores older than the current oldest ice cores (~800 kyr back in time); (ii) logistical preparations for the new ice coring, including to build a new base camp for it; (iii) drilling a pilot borehole for it. In the fiscal year 2017, we carried out a series of glaciological investigations in the Dome Fuji region, inland plateau in East Antarctica, within a frame of the Japanese Antarctic Research Expedition (JARE). We surveyed englacial and subglacial conditions of the ice sheet using VHF ice sounding radars.

Outline of the surveys: The survey team departed Japan in late October, 2017. They arrived at Syowa Station, Antarctica in early November through air routes. From the Syowa Station, the team moved to the Dome Fuji region by tracked vehicles. After arrival at Dome Fuji in early December, the team investigated the ice sheet using radars mounted on the two tracked vehicles, during a total period of 24 days. Total distance for driving for the radar survey near Dome Fuji was about 2,990 km. A major spacing of the survey lines was 5 km. Total area covered by this survey was as large as 20,000 km<sup>2</sup>.

Main results and future prospect: We succeeded to detect a few major internal layers within the deepest ~500 m of the ice sheet in the vicinity of "New Dome Fuji" (hereinafter, NDF) area. In this NDF area, because of presence of the subglacial mountains, ice thickness is at most of locations as thin as 2,300 m or thinner. Dating these very deep internal layers is one of very important study subjects in the near future. Such deep layers tend to become unclear, folded or absent being away from the NDF area. In contrast, at locations where ice is thicker than ~2,800m, we verified that there was basically no detectable internal layers; the power of the radio echo from internal layers has a sharp drop at a depth ~500 m above the bed. Overall, we succeeded to obtain observational data to make detailed maps of bed elevation map and distribution map of the internal layers. In future, we will use such maps for modelling studies of the ice sheet in this region. In addition, analyzing the new data, we will narrow down candidate areas for future drilling. We plan to perform additional radar surveys in such narrower areas in the fiscal year 2018. We plan to collect further information and analyze it.

Keywords: ice core, ice sheet, Antarctica, radar



**Figure 1: Location of Dome Fuji in Antarctica**