

北西グリーンランド氷床 SIGMA-A における雪氷観測

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Glaciological observations at Site SIGMA-A on the northwestern Greenland Ice Sheet

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To clarify the contributions of light absorbing snow impurities and glacial microbes to recent abrupt melting of snow/ice in Greenland, intensive observations of meteorological and snow-physical parameters have carried out at the site SIGMA-A (78°03'N, 67°38'W, 1,490 m a.s.l.) on northwestern Greenland ice sheet during the period June 26 – July 16, 2012 (Fig. 1). Under the expedition, we carried out glaciological observations as snow stake measurement, snow pit observation, snow samplings for water-soluble ions, stable isotope of water (δD and $\delta^{18}O$), and light absorbing insoluble impurities, and snow core drilling with a hand auger. On the snow pit observation, specific surface area (SSA) of snow cover was measured with near-infrared photography (NIR) method. The comparison of the measured data to stratigraphy and grain size by visual observation shows that the SSA fluctuated with variations in snow properties (such as grain type and grain size). Although the distribution pattern of the SSA did not vary with time, its value reduced (Fig. 2). This decrease in the SSA is probably due to an increase in grain size. Data from our SSA measurements will become a valuable part of validating numerical snowpack metamorphism. A 19m ice core was obtained with a hand auger. Bulk density of and visible stratigraphy of the ice cores was observed, and samples for chemical analysis were prepared at the drilling site. Profiles of ice layer percentage and density showed that the ice cores from surface to 3m depth were influenced by melt water owing to recent warming (Fig. 3). In this contribution, we discuss melting features of the observation site shown by ice core analysis and satellite data analysis.

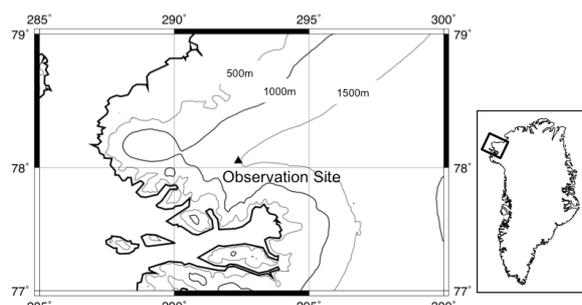


Figure 1. Location of observation site

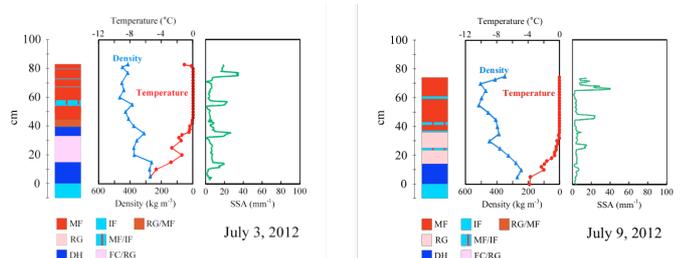


Figure 2. Comparison of results from SSA and snow pit data

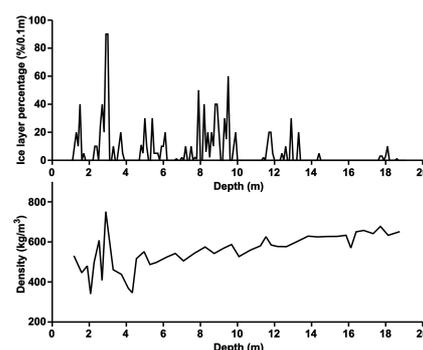


Figure 3. Profiles of ice layer percentage in 0.1m long ice core and bulk density of ice cores