

Estimation of snow surface patterns from the coast to the inland, Dome-Fuji Station, of Antarctica, using camera images

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Snow surface patterns in Antarctica are of practical concern and are important from the standpoint of developing an optimum route in Antarctica. In this study, we estimate snow surface patterns from the coast to the inland of Antarctica using camera images during JARE-59. The interval camera was used to capture the image of snow surface. Snow surface was photographed from November 13, 2017 to December 9, 2017. The number of images from the southern latitude of 69 degrees to 77 degrees was about 14,000 sheets. One sheet was divided into eight zones to distinguish a small-scale snow surface pattern. The pattern of snow surface was classified in three kinds such as 1) deposition, 2) equilibrium, and 3) erosion. We judged the snow surface patterns by sight. When Snow dune/Snow barchan was observed, it was classified as a deposition pattern. When Sastrugi/Glazed surface was observed, it was classified as an erosion pattern. In addition, when snow ripples were observed, it was classified as an equilibrium pattern.

The result of our analysis shows that the frequency of the deposition pattern decreases as latitude rises to 73 degrees south (Katabatic wind region) and then it increases slightly. In contrast, the frequency of the erosion pattern increases as latitude rises to 73 degrees south above which it decreases slightly. On the other hand, there have been no outstanding changes in the equilibrium pattern. The analyzed results of latitude dependence agree with the previous research qualitatively. However, the dominant surface pattern in the inland plateau region was still the erosion pattern. Since we analyzed the data of the outward trip, it is necessary to analyze the data of the return trip from the inland to the coast and to investigate a time scale of the surface pattern changes.

Keywords: snow dune, snow barchan, sastrugi, glazed surface, snow ripple