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CHARACTERISTICS OF CLOUD FRACTION AT NY-ÅLESUND IN THE ARCTIC AND SYOWA STATION IN THE ANTARCTIC

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Cloud has a crucial role in earth radiation budget through its warming and cooling effects. Until now, ground-based and satellite observations have been carried out with many kinds of instruments. Nevertheless, it is not necessarily enough to observe the cloud properties precisely, because cloud has various shape and distribution. It was suggested that global warming will enhance in the Arctic in particular (IPCC 2013). Nishinaka et al. (2013) investigated annual variation of arctic cloud fraction by ground-based observations. On the other hand, the cloud fraction at Syowa station (SYO) in the Antarctic was not investigated sufficiently. In this study, we investigated cloud fraction at SYO from 2005 to 2008. In addition, we compared cloud fraction at Ny-Ålesund (NYA) with that at SYO.

The cloud fractions from three observations were normalized from 0.0 to 10.0 (Nishinaka et al. 2013). Firstly, All-sky camera (ASC) observes all sky every hour with a fish eye lens. Using observed ASC images, we retrieved the cloud amount (Yabuki et al. 2014) without polar night season. Secondly, Micro-Pulse LIDAR (MPL) observes Cloud Base Height (CBH). We defined that (MPL cloud fractions) = (count of detected clouds) / (count of valid clouds) * 10. The temporal and vertical intervals of the measurement are one minute and 30 m, respectively. At last, cloud amount observed by Eye was provided from Baseline Surface Radiation Network (BSRN). The Eye observation is carried out eight times a day.

As a result, it is found that annual variation of monthly-averaged cloud fraction from three observations had a tendency to be similar at both sites: cloud fraction decreased in spring (March) at NYA and in early summer (November) at SYO. Furthermore, Cloud fraction increased in summer (August) at NYA and in autumn (March) at SYO. The statistical analysis on a monthly-average basis revealed that the mean cloud fraction was 7.7 ± 3.5 out of 10.0 at NYA, and 6.2 ± 4.3 out of 10.0 at SYO during the four years. Overall, cloud fraction at NYA was more than that at SYO.

We will also show the results of the comparison of NYA and SYO on CBH from MPL observation.

Intergovernmental Panel on Climate Change (2013), Climate Change 2013.

K. Nishinaka, M. Kuji, M. Yabuki, M. Shiobara, ANNUAL CLOUD VARIATION

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