学 位 論 文 内 容 の 要 旨

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学 位 論 文 題 名

Numerical study of a thick snow band along the Okhotsk Sea coast of Hokkaido Island, Japan
（北海道オホーツク海沿岸に出現する降雪帯の数値的研究）

In winter, the cold Siberian air mass often breaks out from the east coast of the Eurasian Continent toward Japan, and many cloud bands develop over sea areas around Japan. In particular, frequent formations of a thick cloud band are known to occur at speci_c locations. A thick snow band often forms along the Okhotsk Sea coast of Hokkaido Island, northern part of Japan. These cloud bands have been categorized into a strong wind type and a weak wind type, based on the ambient wind speed estimated from the gradient of sea level pressure around the Hokkaido coast.

Numerical simulations were made to investigate the formation and maintenance mechanisms of both strong and weak type snow bands using Weather Research and Forecasting Model (WRF). A strong wind type snow band appeared on 26th of December 2008 was simulated along the coast of Hokkaido Island, moved offshore toward the Sea of Okhotsk, where it intensified, and was sustained for one and a half days. The results show that Sakhalin Island plays an important role in the maintenance of a convergence line and thus the snow band.

Cold air advection from Sakhalin Island produces a strip of warm air between the advected cold air and Hokkaido Island and thus controls the location of the snow band, while topographic blocking by Sakhalin creates the lower level convergence at the Soya Strait and hence enhances the snow band. Temperature and surface-roughness contrast between Hokkaido Island and the Sea of Okhotsk appear to be also important for the initial formation of the snow band.

The results of sensitivity experiments of strong wind type case indicated that 1) the land-sea contrast along the Hokkaido coast largely contributed to the initial formation, 2) the cold advection from Sakhalin Island was important in the maintenance of the snow band, although cold land surface over Hokkaido Island was also important for the enhancement of the snow band, and 3) topography over Sakhalin strengthened the snow band by blocking the low

level winds to form the convergence at the Soya Strait. In addition, ambient wind direction played important role in the advection of snow band. Also to be noted that, the effect of sea ice extent, which would work against cloud band formation, should be investigated by simulating various cases to further improve our understanding of the thick snow bands.