北極域の積雪表面の熱収支およびそれらの季節変動の観測

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Observational study of snow surface heat budget and its seasonal variation

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A field based study has been conducted at the most northern part of Lapland, Finland from 1995. The location is 69° 45'N, 27° 01'E, about 100m ASL and in the northern end of the boreal forest. The aim of this program was to reveal the process of snow-atmosphere interaction in the boreal forest.

The observations were carried on a 15 m tower which is higher than the forest canopy, using the four sets of air temperature, humidity and wind vane from the top of the tower to the 2.5m from the ground. Two sets of short and long wave radiation at the top and bottom of the trees, a heliograph are also used. Snow depth and its temperature at 7 heights, soil temperature and moisture are recorded at 10 minutes interval.

The data obtained at this point were quality checked and used for energy balance study for 7 years from the beginning. Figure 1 is an example of the air temperature of 2.5m high from the ground, minimum record was -45.9 C and 23.3 as the highest. Snow depth of daily mean during these years is shown in Figure 2, have 70 cm to 80 cm as maximum showing rather stable values. Calculating the net radiation (Figure 3) and sensible, latent heat, ground surface heat budget was obtained as Figure 4. From our study, energy flow through atmosphere – snow cover – ground are attempted using SNOWPCK which we use for the heat scheme in the snow cover mostly metamorphism of snow today (Figure 5).

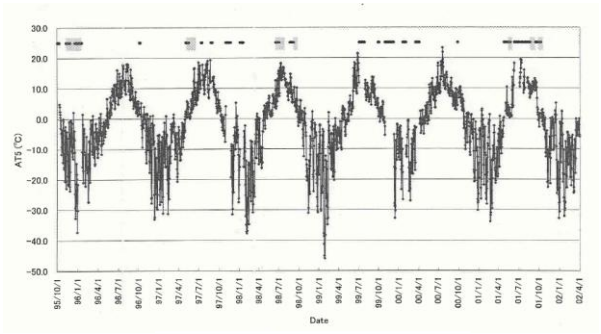


Figure 1 Air Temperature

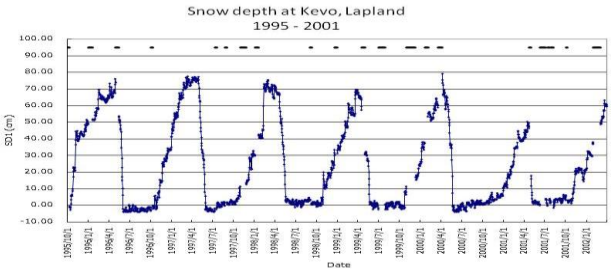
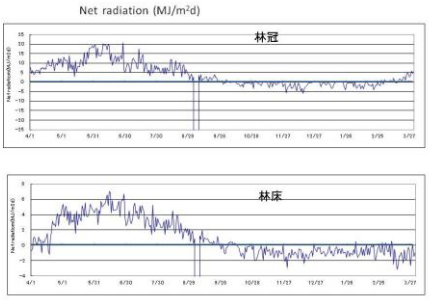
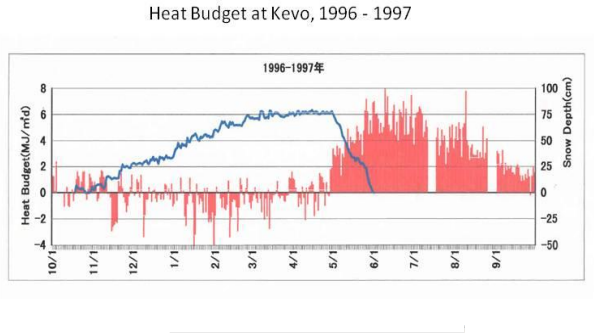


Figure 2　Snow depth at Kevo for 7 years





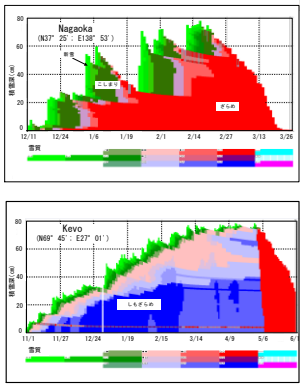


Figure 5　Calculated features of snow cover at Nagaoka and Kevo