

## Application of a simple snow cover model to snow avalanche warning in Sekihoku-pass, Hokkaido

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<http://env.sc.niigata-u.ac.jp/~knishi/index.html>

We describe here our use of one simple snow cover model in an avalanche warning system in Sekihoku-pass, Hokkaido. Firstly, 48 hours predictions of the air temperature, the wind speed and the wind direction with the grid size of 1 km are utilized as the input. Then, the distributions of air temperature, wind speed, and snow depth in the study area were estimated for grid points every 50 m. Snowdrift modeling over complex terrain is a difficult problem that is still being worked out. In this study, we used the following procedures. It has the following four steps: 1) snowfall input is assumed to be uniform over the entire the study area (1 km x 1 km), 2) calculation of the wind field, 3) calculation of snow transport by saltation and suspension, and 4) calculation of the accumulation and erosion of snow on the surface. The wind speed field was obtained using a digital elevation map of grid size 50 m. Once the wind speed is obtained, we determine the friction velocity  $u^*$  at each position and estimate the snow transport by saltation and suspension. When the value of  $u^*$  at a given grid point is higher than a threshold value, snow is eroded, otherwise snow deposits.

Substituting the meteorological data into a simple snow cover model, snow properties like grain type, snow temperature and density can be estimated. Applying the shear strength formulation and slope inclinations, we are able to obtain a stability index SI defined as the ratio of snow shear strength and the shear stress exerted by the snow load.

To testify the forecasting results, measurements of the wind speed distributions and snow pit observations in the study area are planned in this winter. The goal is to increase the accuracy so that the model can become part of the road maintenance operations.