

Comparison study on effect of infiltrated water on snowpack on a flatland and on a slope

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The infiltration of water into the snowpack is an important factor for wet avalanche formation. Several observations of infiltration of the water were carried out on flatland. However it is consider that the difference of water infiltration is exist between the flatland and the slope where avalanches occur. Therefore, we carried out snow pit observations both of in a flatland and in a slope same time and compared the effect of water infiltration into the snowpack. The study sites were set at Tohkamachi Experimental Station, Forestry and Forest Products Research Institute, Tohkamachi, Niigata, Japan. Both of study sites on the flatland and the slope (incline: 40 degrees) were selected at the place where are less effected by the wind erosions and deposition of snow. In addition, we selected the northeast aspect slope to avoid the strong influence of the solar radiation. We found the notable difference on the ratio that the total thickness of the layers consisted of melt form for the thickness of all layers of the snowpack (melt form ratio) between snowpack on the slope and it on the flatland. Average melt form ratio of five times observation results from the early January to the late March 2012 on the slope was 26% higher than it on the flatland. The melt form ratios which were shown the greatest difference were 99% on the slope and 54% on the flatland. It was thought that the cause of the difference of melt form ratio was less formation of vertical water channels on the slope and water infiltrated more uniformly on the slope than the flat land, from our snow pit observations. Then we analyzed it by using the multiple snow layer model including a parameterization of vertical water channel process in snowpack proposed by Katsushima et al., (2009). As results, it was shown that the rate of infiltrated water into vertical water channel for total infiltrated water was 14% at the slope whereas it was 47% at the flatland. Our study has shown the importance of the difference of water infiltration process as a factor in the difference of snowpack between the slope and flatland.

<Reference>

Katsushima, T., Kumakura, T., Takeuchi, Y., 2009. A multiple snow layer model including a parameterization of vertical water channel process in snowpack. *Cold Regions Science Technology* 59(2-3), 143-151.

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