

## Avalanche risk evaluation model and its mapping

# Minoru Akiyama[1]

[1] JACIC

Avalanches are likely to occur at slope where snow depth is deep, slope inclination is steep, vegetation is sparse, and there experienced past avalanche or landslide.

Previous study scored these properties and mapped the risk based on the accumulated scores. However, it is difficult to estimate avalanche risk at each slope quantitatively, because the relation between actual avalanche and these property variables is seldom to be revealed simultaneously.

Yamakoshi district in Nagaoka city, attacked by the Niigataken-Chuetsu earthquake on October 23, 2004 followed by the recorded snowfall with some 2,000 avalanches in 2004-2005 winter, is rich of data such as LIDAR and aerial photographs taken repeatedly, measurement of snow volume as well as avalanche record map, in order to grasp overall damages by the earthquake and to help smooth implementation of various reform works and mitigation of secondary damages.

This study aims to investigate the relation between avalanche ratio and property variables, and propose a mathematical model to evaluate avalanche risk derived from slope inclination, land cover and terrain property reflecting past avalanche or landslide. In the investigation and the mapping five-meter-grid data derived from aerial photo interpretation and image processing, and airborne LIDAR data were used.

At each grid, ideally, the higher the accumulated score is, the higher the avalanche risk. Comparing with the previous study's risk map, this study could present a better risk map where the accumulated score showed very high positive correlation with avalanche ratio.