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Dynamic observations focused on dry avalanche and occurrence conditions of large-scale dry slab surface avalanche

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Abstract

In order to clarify the release of avalanches every winter, observation site has been established in cold snowy regions where the air temperature is below 0℃ almost all winter to observe the meteorological elements and avalanche occurrences using video camera and seismometers. These observations obtained records of 115 dry surface avalanches, 26 wet surface avalanches and 83 wet full-depth avalanches. The form of large-scale avalanches is a dry slab surface avalanche and they were released at two slopes on 40 degrees between elevations of 1650 and 1850 m a.s.l. The large-scale avalanches with horizontal run-out distance longer than 1000 m were almost all dry surface avalanches.

A study of calculated the snow stability index (*SI*) shows that *SI* was low and conditions for the avalanche release from inside snow cover accumulated during heavy snowfall were satisfied except for two large-scale avalanches occurred under little snowfall when large-scale avalanches occurred. The snow pit measurements near the release area of large-scale dry slab surface avalanches reveal the presence of weak layers such as solid-type depth hoar or depth hoar and stability index of the weak layers are low. Moreover, it is under the condition that solid-type depth hoar layers are apt to be formed around the avalanche release area by regularly measuring snow pits.

Therefore, the conditions for large-scale dry slab surface avalanches occurred in the newly deposited snow layer are satisfied when snowfall is heavy, the release of large-scale avalanches is presumably related to the existence of a weak layer such as solid type depth hoar or depth hoar.