



Snowpack properties associated with skier-triggering of dry slab avalanches

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This study investigates snowpack properties associated with skier-triggered dry slab avalanches. This was done by analyzing a data set of over 500 snow profiles observed next to skier-triggered slabs (including remotely triggered slab avalanches and whumpfs) and on skier-tested slopes that did not release a slab avalanche. Specific snowpack characteristics, including hardness difference and difference in crystal size across the failure layer, associated with skier-triggered dry slab avalanches were identified and the frequency of skier-triggering was determined. In contrast to previous studies, the differences in hand hardness and crystal size between the failure layer and both the adjacent layers were considered separately.

The relation of the snowpack variables with fracture initiation and fracture propagation, both of which are required for skier-triggering, was investigated. In order to assess snowpack variables favouring fracture propagation, variables from failure layers associated with skier-triggered slabs that were not remotely triggered and relatively small were contrasted with snowpack variables from failure layers of remotely triggered slab avalanches, whumpfs and relatively large slab avalanches. The properties of the slab overlying the weak layer, as well as the layer above the weak layer, were found to be important for fracture propagation.