

A recipe for widespread persistent deep slab avalanche characteristics in Western Canada

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Of the 29 avalanche fatalities during the avalanche season of 2002-03 in western Canada, at least 14 were attributed to persistent deep slab avalanches, including one seven-fatality incident. The next highest number of avalanche fatalities this decade in western Canada was during the avalanche season of 2008-09 with at least 17 of the 25 fatalities attributed to persistent deep slab avalanches. Analysis of the commonalities between these two avalanche seasons showed that rain on a shallow early season snowpack followed by a long period of clear and cold weather set the stage for a deep slab avalanche problem. Similar early season weather occurred during the avalanche seasons of 2001-02 and 2009-10, yet a widespread persistent weak layer did not develop.

This paper presents a retrospective of the past ten avalanche seasons in western Canada. Weather, snowpack, and avalanche occurrence data are used to test the hypothesis that given weather conditions favourable for early season hard crusts with associated facets, persistent deep slab avalanche characteristics depend strongly on early season snowpack depths. It was found that below average early season snowpack depths is one of the major factors contributing to widespread persistent deep slab avalanche characteristics. Furthermore, below average and variable seasonal snowpack depths, weak re-loaded bed surfaces, and favourable snowpack stratification for step-down fractures seemed to contribute to the persistence. By identifying early season patterns leading to the development of widespread persistent deep slab avalanche characteristics, this paper will aid in forecasting such avalanche seasons by providing a recipe using early season ingredients.