

Character of Naturally Triggered Avalanches and Cornice Failures

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Three meteorologically-related triggers of slab avalanches and cornice failure are observed by avalanche workers: (1) Snow loading during storm and wind events; (2) abrupt temperature changes at the snow surface; and (3) seasonal warming/prolonged midwinter warm periods. We analyze the character and correlations of naturally triggered cornice failures, avalanches and weather data of a twelve year long database from twelve Canadian Mountain Holidays tenure areas in the Columbia Mountains, BC. Avalanche observations in the database include human (56%) and natural triggers (44%). Of the natural triggers, 83% are due to weather and snowpack interactions(Na), 15% are cornice related(Nc), and 2% are icefall related(Ni). Nc occur preferentially on steeper slopes (55% on greater than 45 degrees) and N, NE, and E aspects, whereas 26% of Na (slab) occur on slopes greater than 45 degrees and are more evenly distributed by aspect. In a correlation analysis of avalanche frequency and seasonal climate means, triggers (1) and (2) are significant for Na, while only (1) is significant for Nc. However, when Nc associated with significant snowfall are filtered, the 24-hour trend in minimum temperature appears to be important in inducing cornice failure. In addition, analyzing time lapse photography/movies created with hourly and daily photos aid in understanding cornice processes, formation, and failure.