Statistical runout modeling of snow avalanches utilizing Geographic Information Systems in Rogers Pass, Canada

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Determining snow avalanche runout distance is useful for areas where there is a lack of avalanche observations and no obvious physical signs of avalanche activity. Along roadways or in areas where there is a human presence, details of avalanche runout distance are often recorded; however areas in the backcountry typically traveled by recreationists may not have a recorded history of avalanche activity or runout distances. Knowledge of runout extents mapped in Geographic Information Systems (GIS) has the potential to inform backcountry users on route selection and decision making pertaining to slopes to ski. The Rogers Pass area in Glacier National Park, British Columbia, Canada provides an ideal location for studying over 100 well documented avalanche paths that impact the Trans-Canada Highway, as well as representing a backcountry area that is one of the most popular ski touring destinations in Canada. A statistical approach using the alpha-beta runout model, first developed in Norway, has been adapted for use in Rogers Pass where known avalanche runout parameters along the Trans-Canada Highway corridor have been extracted with GIS and applied to predict runout in lesser known reaches of Glacier National Park frequented by backcountry skiers. Coupled with the runout model is expert knowledge derived from over 40 years of accumulated data and experience of avalanche activity in the highway corridor. In order to achieve accurate results a high resolution DEM was created for the study area using digital stereo photogrammetry. Comparisons are made of the runout model output from both high and low resolution DEM.