

The importance of terrain analysis in differentiating basins prone to debris flows from fluvial basins

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This paper reports on the application of digital elevation models (DEM) and geographic information systems (GIS) to address the growing threat of debris flow hazards in mountainous regions. Thirty-three basins between Banff and Lake Louise were selected for the study due to the risk to the Trans-Canada highway. Twenty three of the basins have a documented history of debris flow activity. Given the differences in the dynamics of debris flows and fluvial processes, it may be possible to use terrain variables to differentiate debris flow prone basins from those which are fluvial-dominated basins. The key DEM-derived morphometric measures employed are slope gradient and aspect, profile, plan curvature and overall curvature. In addition, compound measures such as Melton R, basin shape, and minimum stream channel gradient calculated within a GIS are employed. The measures are subjected to a two sample difference of means test to determine whether or not a significant difference exists between the two basin types.