IDENTIFICATION AND MAPPING OF AVALANCHE HAZARD ZONES EMPLOYING TERRAIN, SNOW COVER AND METEOROLOGICAL PARAMETERS ON WESTERN PART OF HIMALAYAN RANGE

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Abstract: Avalanches are the most common natural uncertainties occcuring in the mountain areas, and hence, identification and mapping of avalanche hazard zones is necessary for planning future development activities. The study area is near Manali-Leh Highway which generally covers by the snow (38%) on high altitude regions of Himalayas. Avalanches are triggered in the study area when snowfall ensuing in loss of life, property and further the transportation and communication affected by the debris, which sequentially limits the mitigation measures. Therefore in this study, three major causative parameters, i.e. terrain characteristics, snow-pack condition and prevailing meteorological conditions, have been incorporated for the identification of avalanche hazard zones. Geo-Informatics analysis techniques have been used by mixing Ground Configuration, Digital Elevation Model (DEM) and Satellite Imagery to assess the different geographical factors triggering an avalanche. This study also involves the identification and mapping of the aerial extent of snow cover, snow types, major land cover features and discrimination between snow/cloud, using optical satellite imagery. Causative criteria parameters, such as altitude, ground configuration, ground cover, slope and aspect, have been integrated into a GIS environment and assigned weights individually as well as cumulatively using the ranking method. Interestingly study found that 10 % area under the maximum hazard-prone zone.

Keywords: Snow; Digital Elevation Model (DEM); Multi Criteria Evaluation (MCE) Meteorology; Avalanche hazard