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PRELIMINARY ASSESSMENT OF LANDSLIDE AND ROCKFALL HAZARDS USING A DEM (OPPSTADHORNET, NORWAY)

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Abstract

The increasing availability and precision of digital elevation model (DEM) make possible the assessment of mass wasting prone area in regions where only few data are available. Starting with only a pair of stereo aerial images and a topographical map, this approach is performed in 6 main steps which include: DEM creation; Identification of geomorphologic features; Determination of the main sets of discontinuities; Mapping of the most likely dangerous structures; Preliminary rock-fall assessment; Estimation of the large instabilities volumes.

The method is illustrated by two types of mass wasting affecting the Oppstadhornet mountain (730m alt): (1) a huge slow-moving (about 1 cm/a) rockslide of about 10 million cubic meters and (2) a large area of potential high-energy rock falling. The orientations of the main foliation and of the two sets of major discontinuities have been determined directly from the DEM. These results are in very good agreement with measurements collected independently by a field survey. Spatial arrangements of these discontinuities and foliation with the topography revealed two hazardous structures: a sliding plane and a wedge. Maps of potential occurrence of these hazardous structures show highly probable sliding areas at the foot of the main landslide and a zone of potential rock falls in the eastern part of the mountain.