



## **Identification of rockfall hazard in the "Les Pics" area (Wallis, Switzerland) by DEM analysis**

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The "Les Pics" area, located in the Rhône valley (canton of Wallis, Switzerland), is a complex unstable system, composed by a deep-seated landslide and recurrent rockfall activity. This study aims to identify potential rockfall sources by analysis of a laser digital elevation model (DEM) with a cell size of 2 meters. For each DEM cell, the susceptibility to rockfall initiation is evaluated using four criteria: 1. critical dip angle, 2. density of planar and/or wedge sliding, 3. denudation potential of rock masses, and 4. distance to major tectonic accidents.

Critical dip angle was determined taking in account the mean angle of cliffs and peak friction angle of the rock mass. Major discontinuities and tectonic accidents are identified in the morpho-structural analysis. The intersections of these discontinuities with topography were automatically mapped, providing the densities for planar sliding and wedge failure at each DEM cell. The denudation potential of rock masses was determined by calculating a sloping local base level between morphological fix points. The distance to major tectonic accidents is implemented using buffers around the observed features. The combination of these four criteria permits to estimate the failure susceptibility for each DEM cell. The shadow angle method is used to evaluate the runout zones and the kinetic energies from identified rock fall sources. Probability of propagation was determined dividing rockfall transit density by the distance to source zones. The mean probability was determined by multiplying the susceptibility of source cells with the probability of propagation, leading to a preliminary hazard map.

The areas susceptible to rockfall initiation are in good agreement with field observations. On the contrary, the estimation of the probability of propagation needs further development.