

Assessing fracture occurrence using "weighted fracturing density": a step towards estimating rock instability hazard

M. Jaboyedoff^{1,2}, F. Baillifard^{1,3}, F. Philipposian^{1,4} and J.-D. Rouiller¹

¹ CREALP – Research Centre on Alpine Environment, Industrie 45, 1951 Sion, Switzerland

² Quanterra, Ch. Tour-Grise 28, 1007 Lausanne, Switzerland (michel.jaboyedoff@quanterra.org)

³ Institute of Geology and Paleontology, University of Lausanne, BFSH2, 1015 Lausanne, Switzerland

⁴ Bureau d'études géologiques, Le Botza, 1963 Vétroz, Switzerland

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Abstract: Based on the assumption that major class of rock instabilities are created by discontinuities, a method is proposed to estimate the fracture density by means of a digital elevation model (DEM). By using the mean orientation, the mean spacing and the mean trace length of discontinuity sets potentially involved in slope instabilities and a DEM, it is possible to calculate the mean number of discontinuities of a given set per cell of the DEM. This would allow for an estimation of the probability of the presence of at least one discontinuity in a given area or simply in a topographic cell of the DEM. This analysis highlights sites potentially affected by rockslides within a region. Depending on the available data, the mean number can be calculated either by area, or along a line parallel to the mean apparent spacing. The effective use of the probability of occurrence is dependent on the size of the discontinuities because short and closely spaced discontinuities will have a 100% probability of occurrence in each favorable location. The *a posteriori* prediction of a recent rockslide is discussed as an example.