



1 Rockfall prone configurations in calcareous cliffs of the French Subalpine Ranges

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Rock fall hazard evaluation for land use planning needs the detection of potentially unstable rock masses in the cliffs dominating the studied area.

In order to enhance the detection methods, 25 rock falls have been described in a more detailed way than for an inventory. They are representative of middle size rock falls (10 to 100,000 m³) occurring in the French Subalpine Ranges, at an elevation between 200 m and 2000 m. Structural conditions of the rock masses, morphology of the initial cliff surface and the scar, possible failure mechanisms and processes have been studied. Typical failure configurations have been identified, based on the attitude of the failure surface, in relation to the bedding planes and the cliff surface. Irregular cliff morphology appears to be another important susceptibility factor. In most cases, the classical comparison of the average planes of the main joint sets with the average plane of the slope could not define the potentially unstable masses. Rather, those ones are due to joint planes that deviate from their mean set plane or to irregularities of the cliff surface. The proposed investigation method to detect prospective rock falls mainly consists in observing stereoscopic aerial photographs in order to look for critical configurations. Once a critical mass has been detected, its failure probability for a period of the order of one century must be evaluated (or its life expectancy). The main factor to consider for this purpose appears to be the proportion of rock bridges in the potential failure surface.