

Calculation of the rockwall recession rate of a limestone cliff using cosmogenic chlorine-36 in the Montsec Range (Eastern Pyrenees, Spain). Implication in rockfall hazard assessment.

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Rock falls are a primary cause of cliff recession in steep mountainous environments. The Montsec range is located in the Eastern Pyrenees, Spain. The cliff is composed of low densely fractured limestones. The rockwall is affected by rockfalls of different sizes. The rockfall scars are clearly distinguishable by their regular boundaries and by their orange colour which show a clear contrast with the greyish old reference surface of the cliff face. We have dated different stepped surfaces of the rockwall, including the old reference surface, using cosmogenic ^{36}Cl . The total amount of material released by rockfall activity was calculated using a high definition point cloud of the slope face obtained with a Terrestrial Laser Scanner (TLS). The present rockwall surface has been subtracted from the reconstructed old cliff surface. This has allowed the calculation of the total volume released by rockfalls and of the retreat rate. The latter ranges from 0.31 to 0.37 mm/a. This value is of the same order of magnitude as the obtained by other researchers in neighboring regions in Spain, having similar geology and affected by rockfalls.

The treatment of the point cloud (Domènech et al., 2015) has also allowed the construction of the magnitude-cumulative frequency of the rockfall scars, which can be used for rockfall hazard analyses.

Reference:

Domènech G., Mavrouli O., Corominas J., Abellán A., Merchel S., Pavetich S. and Ruger G. (2015): Obtaining magnitude-cumulative frequency curves from rockfall scar size distribution using cosmogenic chlorine-36 in the Montsec area (Eastern Pyrenees, Spain). Geophysical Research Abstracts 17. EGU General Assembly. Vienna.