



## Rock fall analysis: a case study in the eastern Alps (Italy)

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Landslides of different types and velocity represent a significant threat to population and human structures.

In the eastern Alps of Italy, rapid movements such as rockfalls, are often responsible for casualties. This is due to the presence of mountain ranges characterized by strong relief energy and to abundant rainfall, reaching 1500-2000 mm/yr, which favour active morphological dynamics with intense slope erosion and degradation processes.

In the context of the Alps slope instability phenomena, the detachment of blocks from steep walls accounts for 40% of landslides occurrences (Cocco, 1991).

This work deals about the appraisal of the risk to rockfall due to the presence of large unstable blocks located along steep rocky slopes called Crep Savath near the village of Cimolais (800 inh.).

Wall observations showed that the potentially unstable rock volumes exceed 400 cubic meters.

The study area is bounded by Mt. Lodina to the North-West, by the pristine Val Fesena to the West and is located to the right bank of Cimoliana River, close to the Regional Road leading to Vajont Valley, at an altitude of 820-1000 m. a.s.l.

The rockfalls are caused by the structure of the rock masses, as the interaction among discontinuity sets can lead to the isolation of boulders exceeding a hundred cubic meters.

The intense tectonic activity of the past which caused the weak Vajont limestone to thrust over the carbonate "Scaglia Rossa" Formation created the jointing structure of the limestone that forms the top of Crep Savath.

Particular attention was also given to the triggering mechanisms; in this area are especially important rainfall and seismic loads.

A first assessment of the possible transit and stop areas has been observed through in-depth surveying activities carried out by several experts from various Italian Universities.

The team of professionals involved has created a set of detailed geomorphological maps (1:1000) which proved a fundamental starting point for rockfall analysis.

This analysis, combined with airborne laserscanning surveys, allowed to identify possible trajectories.

Along these directions, rockfall simulations were performed by means of the RocFall software and they confirm the high level of risk for the inhabitants of the Cimolais.

As a preliminary results, a series of active measures can be proposed to immediately mitigate risks. This proposal takes into account the high volume of blocks, which in case of a fall render the passive mitigation measures already in place at the back of Cimolais worthless.

Last but not least, the collaboration between engineers and geologists permits to build up realistic scenarios in order to evaluate and quantify all the aspects that rockfalls involve.

Reference:

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