



A case-study: rock fall process concerning an Umbrian hillslope of central Italy

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Rock falls constitute serious hazard in the Italian regions characterized by elevated energy of the relief. The phenomenon needs a major consideration when built-up areas or infrastructures are located at the foothills or in the lower-middle portions of the slope where rock falls might occur. The initiation of a falling process of lapideous blocks from a rock cliff may be due to several reasons, mainly climatic factors and predisposing geo-structural and morphologic conditions. Typically, a series of impacts with the below hillslope and bounces, rolling, and sliding until the arrest, follow the fall phase. We present a study carried out in a slope located in Postignano, in the eastern Umbria region of central Italy. In this site numerous fallen down masses are present, with cubature up to 6 m³, and several prone-to-collapse blocks are evident, confirming the hazard for the integrity of some buildings in the mountain village. Using the software Rocfall (Rocscience Inc.), a parametric analysis has been carried out, considering both different cubature of the potentially falling boulders and blocks' different initial velocities. By means of a back-analysis along several sections of the hillslope, the values for the coefficients of energy restitution have been determined. Thus, the software has been used to estimate trajectories, locations of arrest, and energies of the single blocks moving downslope. Finally, the dimensioning and the positioning of a passive defence work are presented.