Punta Thurwieser rock avalanche and Frank Slide – analyses of hazard and risk based on a discontinuum mechanics approach

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Rockfalls are modelled as the movements of single rock blocks over a surface or as the movement of a viscous mass over a surface (e.g. DAN). In reality a mass of discrete, interacting rock blocks is moving downslope. Thus the program PFC (Particle Flow Code) based on the Distinct Element Method was modified in order to model rock mass falls realistically in 3 dimensions based on physical relations. According to observations in nature, several kinds of movements of the rock blocks (Broilli, 1974) have to be distinguished during the computation (Bozzolo, 1987): free falling, bouncing, rolling and sliding. In order to achieve an appropriate simulation of these different kinds of movements by PFC, some modifications using the implemented programming language (Fish) were necessary. The application of this method is demonstrated with the examples Punta Thurwieser (Italy) and Frank Slide (Canada) in order to demonstrate how hazard and risk can be evaluated using the described approach.