HAZARD ZONING FOR ROCK-FALL: A NEW AND STANDARDIZED APPROACH FOR AUSTRIA ACCORDING TO ÖREK, DEMONSTRATED ON A CASE STUDY.

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The *Österreichische Raumordnungskonferenz* (ÖROK) installed a partnership in 2011 dealing with „Risk management for gravitative natural hazards in spatial planning“. As gravitative natural hazards have a decisive influence on spatial development in the Alpine Region, standard procedures for the assessment of the relevance of these processes for spatial planning was developed ([1] ÖROK 2015). This paper describes the recommended procedure to assess the hazards imposed to permanent settlements by rock-fall in a top-down approach.

A first step to define potential conflicts between the reach of rock-fall processes and the presence of settlements is a conservative empirical assessment based on rock outcrops potentially serving as detachment zones and a maximum run-out of such rock-falls leading to a hazard indication map. This approach is based on existing cartographic information only, field investigations are not necessarily involved in this stage. To ensure a conservative result, the use of a high-resolution 1 m terrain model to identify rock outcrops is recommended. Every pixel of the terrain model showing a slope inclination of ≥ 45° is treated as a potential detachment source for rock-fall. The reach is delineated by a geometric angle of 30° starting from the detachment points. All such maximum run-outs are summarized by a polyline depicting the potential of rock-falls reaching inhabited areas.

The next step includes a thorough examination of those areas showing conflicts between reach angle and settlements. This stage includes field investigations assessing mapping of maximum reach blocks, block size distributions, underground conditions of the transit zone and conditions of rock-outcrops acting as potential detachment zones. All these informations are subsequently integrated in a 3-D rock-fall simulation. As a result the modelling enables a delineation of areas out of reach (no rock-fall hazard), areas with potential impact energies ≤ 100 kJ (low intensity) and areas with potential impact energies > 100 kJ (high intensity).

References

[1] ÖROK (Österr. Raumordnungskonferenz) (Hrsg.) (2015): Risikomanagement für gravitative Naturgefahren in der Raumplanung. – Wien (=ÖROK-Schriftenreihe 193)