Risk
Risk Assessment
Sociology of Disasters
Uncertainty
Warning Systems

ROCK AVALANCHE (STURZSTROM)

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Synonyms

Rock avalanche; Rock-fall avalanche; Rock-fall generated debris stream; Sturzstrom

Definition

Rock avalanche (sturzstrom) were defined by Hsü (1975) based on Heim's (1932) description of phenomena described with the German terms "Bergsturz," "Trümmerstrom," "Sturzstrom" as a stream of very rapidly moving debris derived from the disintegration of a fallen rock mass of very large size; the speed of a rock avalanche often exceeds 100 km/h, and its volume is commonly greater than 1×10^6 m^3.

Discussion

Rock avalanches are among the most hazardous *landslides* phenomena due to the speed, size, and run-out distance. Rock avalanches have destroyed entire villages and killed thousands. The run-out distance of a rock avalanche often exceeds several kilometers and the mobility becomes visible by the run up on opposite valley slopes, which is related to the volume of the initial rock failure (Scheidegger, 1973) and the morphology of the flow path (Nicoletti and Sorriso Valvo, 1991) but can also be influenced by the entrainment of saturated soil material or ice along the flow path (Hungr and Evans, 2004).

Systematic regional analyses of the temporal spatial distribution of rock avalanches have shown that rock avalanches do not distribute randomly but occur along lithologically, structurally preconditioned mountain fronts during climatic phases of higher run off or following deglaciation (e.g., Hermanns et al., 2006a, Blikra et al., 2006). Due to post failure slope deformation, rock avalanches often occur repeatedly at the same location with short recurrence intervals while neighboring slopes remain stable (Hermanns et al., 2006b). In addition, in tectonically active mountain regions, rock avalanches are often triggered by *earthquake*s and cause the formation of *landslide dams* adding to the *Disasters* (e.g., Petley et al., 2007).

Rock avalanche *Hazard* assessment involves characterizing potentially unstable slopes followed by *Slope Stability* analyses of the slope and run-out modeling of the rock avalanche. Due to the enormous energy released during the event, rock avalanches cannot be mitigated, and unstable rock slopes, which might form rock avalanches, can rarely be prevented from failure (e.g., artificial draining of slope). If a potential failure is imminent, complete *Evacuation* of the potentially affected run-out area is the only *Disaster Risk Management* measure.

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Cross-references

Disaster
Disaster Risk Management
Earthquake
Evacuation
Hazard
Landslide
Landslide Dam
Recurrence Interval
Slope Stability

ROCKFALL

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Synonyms

Rock fall