

# Master's Thesis (MA, 30 ECTS)

## Estimation of Energy Dissipation During Rock Fall Fragmentation

### Description

Rock fall events represent a serious hazard in mountain regions. Therefore, so called "Hazard Maps" are developed and safety measures are designed. The main driving factors, which are considered in the designs of such maps and safety constructions are the block form, the energy distribution and block size distribution on the slope as well as jump heights. These information base mostly on onsite mappings of the rock blocks and rock fall modelling.

However, there is a huge discrepancy between the insitu block size distribution (IBSD) within the rock mass and the rock block size distribution on the talus/slope (RBSD). This difference results from the fragmentation during the movement of the bouncing rock blocks. The fragmentation is caused by an energy dissipation when part of the kinetic energy is transferred into fragmentation energy ( $E_{frag}$ ) when the block hits the slope. This dissipation and fragmentation process is hardly considered in current rock fall simulations.

In this thesis, an approach shall be developed to estimate the energy dissipation during rock fall events due to rock fragmentation and how this knowledge can be implemented in rock fall simulations:

- What factors influence the fragmentation during rock fall events?
- How can the energy dissipation by rock block fragmentation be estimated?
- What influence has the energy dissipation and rock fragmentation on the results of rock fall simulations?

### Methodology

- Literature research on rock fall fragmentation and destruction energy
- Development of an applicable approach to estimate  $E_{frag}$
- Estimation of the rock fall fragmentation by comparing the IBSD with the RBSD
- Modelling the influences of the energy dissipation and rock fall fragmentation
- Writing a technical report with the found results

This project shall contribute to an improvement in the analysis of the stability of block rock masses using remote sensing and numerical modelling.

Templates for the scientific report can be found on the institute's homepage. There is also a guideline for scientific writing free downloadable at the homepage, whose compliance is mandatory. The language for the report can either be in English or in German.

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**Start** by appointment

**Duration** ca. 6 months

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