



Repeated controlled rockfall trajectory testing

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The variability of rockfall trajectories regarding their travel paths, velocities, run out distances and jump heights requires statistical and stochastic methods for both the analysis of field values and numerical simulations. However, the perturbations mostly are considered only within the simulations because only few stochastic data are available coming from the field. This means, simulation software is calibrated based on the data of single rockfall events without the knowledge whether the observed/recorded events were average or extreme ones.

In a field study we now tested the conduction of rockfall tests on a natural slope using natural boulders. Each boulder was thrown several times from the same starting point. This procedure provides a view on the variability of the different trajectories. The outcome helps to better understand the rockfall process but more provides valuable datasets that can be used for the calibration of rockfall simulation models.

The rockfall experiments were recorded using two high speed cameras, an internal independent high frequency data logging unit measuring 3D accelerations and 3D rotational velocities. An external so-called „Local Positioning System“ enabled a live tracking of the blocks in the field. More than repetitions were achieved using mainly 4 different blocks. The presentation shows the first analysis of the experiments including validation of measurement systems, the natural variability of the rockfall tests and comparison with corresponding theory and simulations.