



Challenges in rockfall trajectory research

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To predict rockfall trajectories on slopes that are not protected by civil engineering structures, the presently available 2D and 3D rockfall models perform quite well. This has been demonstrated in many scientific papers as well as in this session. However, to arrive at an accurate modelling of the rockfall hazard, which is objective and scientifically sound, there are still major challenges to be met. These can be separated for the three main areas that can be distinguished on an active rockfall slope: 1) the rockfall source area, 2) the transit area, and 3) the deposit area. The major future challenge for pure rockfall research in all the three areas is to quantify the effect of different slope surfaces on the energy dissipation during a rockfall rebound and to develop objective methods for characterising the elasticity and roughness of different surface types. A huge challenge in the rockfall source area is to develop methods to predict better when and what rock (shape and size) will fall. In the transit and stopping area an additional challenge is to obtain a relationship between the amount of energy that can be absorbed by different types of vegetation during an impact and the impact height. To meet the first and last mentioned challenge, opportunities should be created for real-size rockfall experiments on sites with a wide range of terrain and vegetation characteristics, which are recorded by high-speed digital cameras. Optimal methods to predict the rockfall frequency, the rock shape and size will probably combine remote sensing methods with control measurements by hand.