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0.1 Spatial modelling and prediction of rockfall hazard: the effect of protection forests

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In most densely populated mountainous areas throughout Europe, models are used in trajectory studies as a basis for hazard prediction and risk zoning. Regarding rockfall in the European Alps, the majority of such studies neglects the mitigating effect of the existing forest cover. As a result, the rockfall hazard is overestimated, both spatially (length of runout zone) and in terms of energy. Consequently, the installed technical protective measures that are taken are too expensive. In many cases, innovative forest management could be sufficient to reach an acceptable level of safety. Critical for improving these rockfall hazard assessment studies is quantifying the effect of protection forests on rockfall hazards and integrating this effect in 3D simulation models. We will introduce a generic 3D simulation rockfall model, called Rockyfor, which meets the conditions given above. To obtain knowledge and data on rockfall in forests we carried out real-size rockfall experiments on forested and non-forested sites on a mountain slope in the French Alps. Model validations on these test sites and elsewhere show that simulations models allow us to predict the rockfall hazard spatially and accurately, taking into account the effect of forests. Modelling approaches and results that are validated with experimental data will be presented.