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NoeTALUS - Methods for producing rock fall hazard maps of different scales in Lower Austria

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For regions with distinct rock cliffs, rock fall represents a serious hazard due to high propagation velocities. In order to pursue territorial planning with an awareness of rock fall hazard, it is necessary to identify those areas that are or may be affected by this process. A detailed analysis of rock fall hazard (at regional or municipal scale) represents a great challenge, as many parameters that are difficult to quantify in the field must be considered (e.g. block sizes, surface conditions, etc.).

The aim of the ongoing “NoeTALUS – Rock fall hazard modelling in Lower Austria” research project is to evaluate and suggest methods, applicable to different scales, which will enable the production of reliable rock fall hazard maps at a justifiable amount of human and financial resources.

Rock fall hazard maps are being prepared for two pilot areas in Lower Austria: the municipality of “Dürnstein” and the western part of the municipality of “Waidhofen an der Ybbs”. In order to answer questions regarding the required quality and effort in collecting data relevant to numerical modelling, investigations under two topographic scales are being conducted. The entire project area is processed at a regional scale ($M \leq 1:10.000$). Additionally, ten selected domains within the project area are investigated at a slope scale ($M \geq 1:5.000$). In this context, remote sensing methods (LiDAR, photogrammetry) are to be evaluated with regard to their benefits.

Two different simulation models, Rockyfor3D and WURF3D, are used to model rock fall spreading and magnitude. Both models differ in their calculation approach with regard to surface-roughness, energy-damping and rock fragmentation.

Rock fall simulations are being evaluated by comparing observed and calculated deposits. Relevant indicators such as the Critical Success Index, Factor of Conservativeness, or area under ROC are being employed for this task.

The selected approach is intended for identifying those methods that can contribute to the creation of reliable rock fall hazard maps at a reasonable cost. Finally, “recommendations for action” concerning the production of rock fall hazard maps are to be made based upon the comparison of different methodologies.

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