



Implementation of landslide susceptibility maps in Lower Austria as part of risk governance

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Landslides frequently cause damage to agricultural land and infrastructure in Lower Austria – a province of Austria. Also settlements and people are threatened by landslides. To reduce landslide risks and to prevent the establishment of new settlements in highly landslide prone areas, the project “MoNOE” (Method development for landslide susceptibility modeling in Lower Austria) was set up by the provincial government. The main aim of the project is the development of methods to model rock fall and slide susceptibility for an area of approx. 15,900 km² and to implement the resulting susceptibility maps into the spatial planning strategies of the state.

Right from the beginning of the project a close cooperation between the involved scientists and the stakeholders from the Geological Survey of Lower Austria and the Department of Spatial Planning and Regional Policy of Lower Austria was established to ensure that method development and final susceptibility maps meet exactly the needs and demands of the stakeholders. This posed huge challenges, together with its realization in the large study area and a (heterogeneous) complex geological situation,. Limitations were given by restricted data availability (e.g. for geology or landslide inventories) in such a large study area.

Rock fall susceptibility was modeled by a combined approach of determining rock fall release areas by empirical slope thresholds (dependent on geology) followed by empirical run-out modeling. Slide susceptibility was modeled based on the statistical approaches of weights of evidence (WofE) and generalized additive models (GAM) by two different research groups. Huge efforts were spent on the validation of all susceptibility models.

In a later stage of the project we found that the best scientific maps are not necessarily the best maps to be implemented in spatial planning strategies. Thus, in close cooperation with the stakeholders, decisions had to be taken to find the best resolution of the maps, the number of susceptibility classes, their colour and naming, as well as on the instructions for actions referring to each susceptibility class respectively.

All susceptibility maps showed very good validation results. Both, the WofE and the GAM slide susceptibility map showed high median AUROC values of 0.9 and the geomorphological plausibility proved to be very good in both cases. Due to these results it was concluded the stakeholders should take the decision which of the two slide susceptibility maps should be used. This decision was performed as a blind test providing resulting maps and their respective performance measures but coded with a color so that the stakeholders did not know which maps were produced by whom and with which method. This presentation is thus focusing on a detailed description of all these aspects and it is discussed how this participative approach led to a high acceptance of the final landslide susceptibility maps by the stakeholders. Consequently these maps are going to be implemented in the spatial planning strategies soon.