

„Local natural hazard exposure“ a GIS based model for the assessment of alpine natural hazards on a municipal level

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INTRODUCTION AND AIMS

Natural disasters are growing globally up in our awareness. In our environment the temporal and spatial appearance of disaster causing events are changing and also the consequences of these processes for our societies are changing significantly. In consequence of more and more detailed media reports an increasing awareness for disasters can be noticed. In Carinthia (Austria), an expert group has taken up this issue and developed a GIS based assessment application for alpine natural hazards (Schober et al., 2012). Model results can be easily accessed within a web application, whereas the calculations of the assessment model are focused on a municipal scale.

The increase of mobility associated with the development of roads and other infrastructure lead to an increasing risk of being affected by floods, debris flow, avalanches and rock falls. Therefore it is necessary to expand the existing protection approaches by a risk-based assessment of natural hazards. Figure 1 presents a screenshot of the developed risk assessment web application. Detailed information on different hazard scenarios including large scale and interactive maps can be obtained easily. Moreover statistical reports and figures give precise information about the potential impact of natural hazards.

The main focus of the assessment model can be summarized on the following general questions:

1. What can happen? Cartographic delineations show the essential alpine natural hazards (flood, debris flow, avalanche, rock fall and landslide).
2. Where and with which intensity can natural hazards occur? Classified maps demonstrate existing risk zones for each hazard process.
3. Which objects and properties are affected? Affected goods and properties are identified

(such as residential- commercial- and industrial buildings and infrastructure).

4. What is the potential damage? A GIS model calculates the potential damage for each hazard process separately.
5. How can results be published? A web application including interactive maps for the visualization of model results has been developed to show risks for each municipality and hazard process.

METHODOLOGY

In order to carry out a comprehensive risk assessment model, at first potential hazards have to be identified. The presented model includes alpine natural hazards: floods, debris flow, rock falls/ landslides and avalanches. Subsequently a catalog of properties and goods was developed. Buildings, roads and infrastructure (e.g. electric power supply, water supply and disposal facilities), and agricultural areas as well as building land based on regional and urban planning were included into the catalog.

Using the above mentioned input data a Python based GIS model was developed. This computer model automatically calculates potential damages and stores all results into a database. The visualization of all model results is realized with a web application which includes statistical reports, figures and interactive maps.

CONCLUSIONS

The web platform has already been implemented and is actually in practical use. The presented model provides a decision support tool for an objective and transparent planning of protection measures against natural hazards. The main target groups are official authorities on the local administration (municipality) level (such as civil protection, as well as risk prevention and disaster management). Moreover the web application can be an

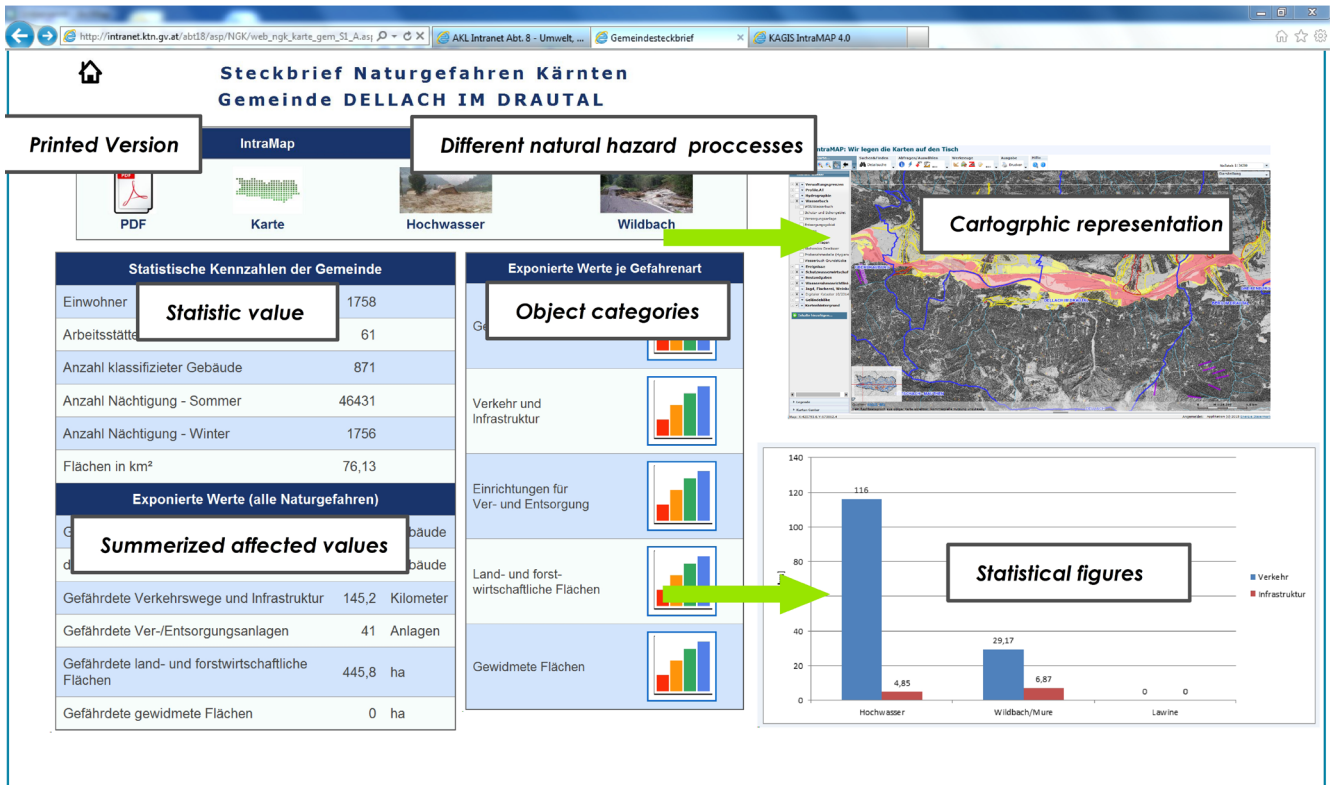


Figure 1. Web application for assessment of natural hazards and risks

effective tool for emergency management. Another goal of the project was the active information of the public and with that an increase of awareness on natural hazards.

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KEYWORDS

risk assessment, risk analysis, natural hazards, object categories, internet platform

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