

EnviroInfo 2008 Lüneburg

Towards an information system for early warning of landslides

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Agenda

- Introduction and partners
- EGIFF at a glance
- Overview Subprojects
- Some first results on automated risk mapping



Introduction

- Increased number of geological events such as landslides
- Strong demand for early warning systems to save lives and properties
- The central components of an early warning system for natural phenomena are
 - the recognition of the threats
 - the assessment and evaluation of the danger
 - the dissemination and communication of the warning
 - the management of public reaction to the warning



Objectives of EGIFF-Project

- Main Objective: improve the early warning chain by main components
- Research Focus
 - Geotechnical evaluation of mass movements using the data of past events
 - Coupling of numerical simulations and GIS;
 - Modeling and visualization of spatial relationships
 - Data mining and analysis methods for spatial data (spatial data mining)
 - 3D/4D Geo-database support
- Prototype development and Evaluation on the basis of concrete geological data and application scenarios.

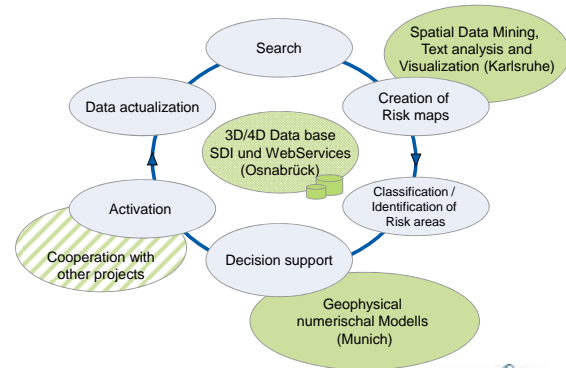


Partner

- German Research Funding (BMBF)
- University of Osnabrück, Institute for Geoinformatics and Remote Sensing (IGF),
- Univ. of the Bundeswehr Munich,
 - Geoinformatics Working Group (AGIS)
 - Institute of Soil Mechanics and Foundation Engineering
- Karlsruhe Institute of Technologie / Univ. of Karlsruhe
 - Institute of Photogrammetry and Remote Sensing (IPF),
 - Research Centre for Information, Technologies (FZI)
- disy Informationssysteme GmbH
 - Integration / Dissemination and Exploitation of Results
 - Main findings might lead into Product Development
 - SME



EGIFF at a glance



Subproject 1 Development of an interconnected information and simulation system"

- **Focus: Interlinked Numerical Simulation System and a Geographical Information System (GIS).**
 - Development of coupled information and simulation models for mass movements
 - More precise predictability of the exposure of slopes.
- **Expected Results of the simulation are parameters such as**
 - hazard potential
 - deformation and movement vectors and stability indices
- **The main goal**
 - medium for distributing information to the responsible hazard managers.
 - Investigation on "if and how" uncertainties of the data used in the simulation and subsequent processes can be modelled.

Modeling for specific risk sites



Subproject 2: Textual analysis and Spatial Data Mining

- Collection, pre-processing and analysis of relevant structured and unstructured data
- Central tasks :
 - automatic extraction of early warning-relevant information and spatial references from textual messages;
 - transfer techniques for automated data analyses in the domain of applied geosciences
 - combination of results of analyses of structured and unstructured data related to natural hazard
- transferability to other natural hazard types
- Special Focus: investigation of data mining techniques for spatial data

Large scale risk maps



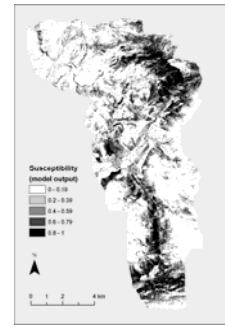
Subproject 2: Areas



- Overall Area: 2.601,5 km²
- 96 communities/townships
- 372.000 inhabitants
- Examination areas
 - Hochtannberg
 - Walgau
 - Walsertal



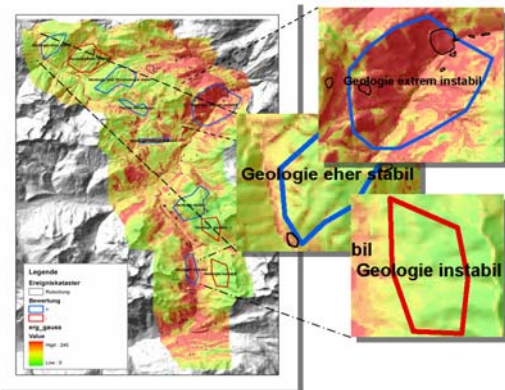
Subproject 2: Generation of risk maps



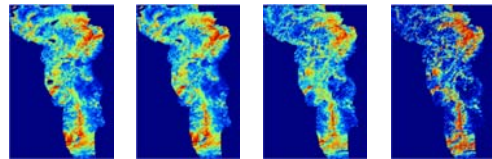
- Statistical Analysis
 - R-Software
- Coupling with GIS
 - disy GIStern
- Via Services
 - WPS/WCPS



Subproject 2: Areas which should be further analyzed



Statistische Klassifikation: Some results



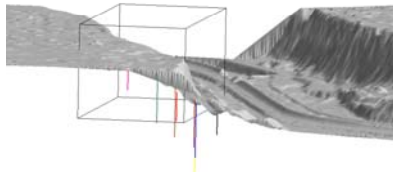
Methode	Testfehler [%] 5 CV				
	Trainings-set [px]	1920	960	480	240
Gausspr		21.8	22.3	23.6	25.4
LKL_ARD_05		19.4	21.4	28.5	32.4
LKL_ARD_07		19.1	21.2	25.4	27.3
KSVM		19.8	21.2	21.7	25.7

Table 2: Results/ Classification error for HTB



Subproject 3: 3D/4D Database

- primary geological data in a geo-database management system
- geological spatial and time-related primary data
- 3D visualization **at any time**.



Conclusion and further Work

- Research on new Areas of risk management and mapping
 - Coupling models and GIS
 - Using statistical analysis (R) for spatial analysis
 - Incorporating text messages and text analysis
 - 3D/4D database management
- Project runs for another two years
 - Some first very promising results on statistical analysis
- Gaining experiences also with web services for processing information in the large (WPS and WCPS)



Thank you for your attention

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