Geophysical Research Abstracts
Vol. 17, EGU2015-14180, 2015
EGU General Assembly 2015

RiskChanges Spatial Decision Support system for the analysis of changing multi-hazard risk

Cees van Westen (1), Kaixi Zhang (1), Wim Bakker (1), Vera Andrejchenko (2), Julian Berlin (3), Roya Olyazadeh (4), and Irina Cristal (5)

(1) University of Twente, Faculty ITC, Earth Systems Analysis, Enschede, Netherlands (c.j.vanwesten@utwente.nl), (2) University of Salzburg, Department of Geoinformatics , Salzburg, Austria, (3) Technical University of Delft, Delft, Netherlands, (4) University of Lausanne, Switzerland, (5) Technical University of Dortmund, Faculty of Spatial Planning, Dortmund, Germany

Within the framework of the EU FP7 Marie Curie Project CHANGES and the EU FP7 Copernicus project INCREO a spatial decision support system was developed with the aim to analyse the effect of risk reduction planning alternatives on reducing the risk now and in the future, and support decision makers in selecting the best alternatives. Central to the SDSS are the stakeholders. The envisaged users of the system are organizations involved in planning of risk reduction measures, and that have staff capable of visualizing and analyzing spatial data at a municipal scale. The SDSS should be able to function in different countries with different legal frameworks and with organizations with different mandates. These could be subdivided into Civil protection organization with the mandate to design disaster response plans, Expert organizations with the mandate to design structural risk reduction measures (e.g. dams, dikes, check-dams etc), and planning organizations with the mandate to make land development plans.
The SDSS can be used in different ways: analyzing the current level of risk, analyzing the best alternatives for risk reduction, the evaluation of the consequences of possible future scenarios to the risk levels, and the evaluation how different risk reduction alternatives will lead to risk reduction under different future scenarios.
The SDSS is developed based on open source software and following open standards, for code as well as for data formats and service interfaces. Code development was based upon open source software as well. The architecture of the system is modular. The various parts of the system are loosely coupled, extensible, using standards for interoperability, flexible and web-based.
The Spatial Decision Support System is composed of a number of integrated components. The Risk Assessment component allows to carry out spatial risk analysis, with different degrees of complexity, ranging from simple exposure (overlay of hazard and assets maps) to quantitative analysis (using different hazard types, temporal scenarios and vulnerability curves) resulting into risk curves. The platform does not include a component to calculate hazard maps, and existing hazard maps are used as input data for the risk component. The second component of the SDSS is a risk reduction planning component, which forms the core of the platform. This component includes the definition of risk reduction alternatives (related to disaster response planning, risk reduction measures and spatial planning) and links back to the risk assessment module to calculate the new level of risk if the measure is implemented, and a cost-benefit (or cost-effectiveness/ Spatial Multi Criteria Evaluation) component to compare the alternatives and make decision on the optimal one. The third component of the SDSS is a temporal scenario component, which allows to define future scenarios in terms of climate change, land use change and population change, and the time periods for which these scenarios will be made. The component doesn't generate these scenarios but uses input maps for the effect of the scenarios on the hazard and assets maps. The last component is a communication and visualization component, which can compare scenarios and alternatives, not only in the form of maps, but also in other forms (risk curves, tables, graphs)