Geophysical Research Abstracts
Vol. 16, EGU2014-5968, 2014
EGU General Assembly 2014

Prototype development of a web-based participative decision support platform in risk management

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This paper discusses the proposed background architecture and prototype development of an internet-based decision support system (DSS) in the field of natural hazards and risk management using open-source geospatial software and web technologies. It is based on a three-tier, client-server architecture with the support of boundless (opengeo) framework and its client side SDK application environment using customized gxp components and data utility classes.
The main purpose of the system is to integrate the workflow of risk management systematically with the diverse involvement of stakeholders from different organizations dealing with natural hazards and risk for evaluation of management measures through the active online participation approach. It aims to develop an adaptive user friendly, web-based environment that allows the users to set up risk management strategies based on actual context and data by integrating web-GIS and DSS functionality associated with process flow and other visualization tools. Web-GIS interface has been integrated within the DSS to deliver maps and provide certain geo-processing capabilities on the web, which can be easily accessible and shared by different organizations located in case study sites of the project.
This platform could be envisaged not only as a common web-based platform for the centralized sharing of data such as hazard maps, elements at risk maps and additional information but also to ensure an integrated platform of risk management where the users could upload data, analyze risk and identify possible alternative scenarios for risk reduction especially for floods and landslides, either quantitatively or qualitatively depending on the risk information provided by the stakeholders in case study regions. The level of involvement, access to and interaction with the provided functionality of the system varies depending on the roles and responsibilities of the stakeholders, for example, only the experts (planners, geological services, etc.) can have access to the alternative definition component to formulate the risk reduction measures. The development of such a participative platform would finally lead to an integrated risk management approach highlighting the needs to deal with involved experts and civil society in the decision-making process for evaluation of risk management measures through the active participation approach. The system will be applied and evaluated in four case study areas of the CHANGES project in Europe: Romania, North Eastern Italy, French Alps and Poland. However, the framework of the system is designed in a generic way so as to be applicable in other regions to achieve the high adaptability and flexibility of the system. The research has been undertaken as a part of the CHANGES project funded by the European Commission's 7th framework program.