



Geological risk assessment, mitigation and IT services and tools management: the BRISEIDE Project approach

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The increasing damage caused by natural disasters in the last decades, amplified by recent events including landslides (Messina, Sicily, September 2009), earthquakes (L'Aquila, Abruzzo, April 2009), forest fires (Greece, 2008) and floods (Central Europe) in the last years, points out the need for interoperable added-value services to support environmental safety and human protection. Many environmental analyses, e.g. monitoring seismic sequences, early warning systems for the evolution of intense rainstorms, the path of forest fires, cannot be performed without considering the evolution, over time, of geographic features. For this reason, providing access to harmonized data is only one of several steps towards delivering adequate support to risk assessment reduction and management. Scope of the present work is to present the implemented risk reduction and management pilots developed by BRISEIDE's team project. The project BRISEIDE – “BRIDging Services, Information and Data for Europe” is an EU-funded project which aims at providing operators and analysis within civil protection scenarios with access to spatio-temporal datasets and simulation capabilities. Spatial analysis and spatio-temporal web processing services (WPS) are exposed via the web and made available by integrating them within existing open source frameworks through compatible WebGIS applications. This ambitious goal is based on an articulated software architecture and IT tools infrastructure which will be deployed over a pan-European set of pilots. The methodological approach developed in this research responds to a number of key requirements, namely improving access and reuse of existing OWS through new value added operational oriented services, introducing the time variable into the existing geo-databases, integrating existing geo-databases with operational databases, delivering query, processing and visualization services for spatio-temporal data and finally supporting easy orchestration of web processing services to create 3D geo-browsers complex simulations. Two specific use cases focused on geological risk have been carried out in order to verify the IT tools implemented during the project. The first one is dedicated to the evaluation of coseismic geological effects of earthquakes on transport networks and critical facilities. Mapping and characterizing such effects assume a key role in terms of risk assessment and mitigation. Particular attention has been paid to surface faulting and slope instabilities (rock falls) to point out the vulnerable strategic elements located within the risk areas, including transport networks (roads and railways), lifelines (gas and water pipelines) and critical facilities (high-risk industrial plants). The second use case is mainly addressed to implement a simplified landslide risk mapping procedure by overlapping landslide areas (using Italian landslide inventory, the IFFI project) with available data on potential exposed elements derived by national datasets. One of the main results of BRISEIDE is the implementation of added-value spatio-temporal services based on potential final users and stakeholder needs and practices. For this reason, the project has a relevant number of user partners, such as Agencies and Public Administrations, dealing with urban planning, environmental management and risk management, that need spatio-temporal processing of Geographical Information to support decision making in critical situations.