Disseminating geospatial information on landslides and floods in Italy

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We describe a prototype system for the dissemination of geospatial information on landslides and floods in Italy. In the framework of the Integrated Management of the Environmental Data project GIIDA, of the Italian National Research Council (CNR), the research Institute for Geo-Hydrological Protection (IRPI) is porting the current web-based geographical infrastructure towards a stronger compliance with OGC standards, in terms of publication, access and discovery services. IRPI already distributes geospatial information on landslides and floods using standard web-GIS technology, but the requirement for compliance with international standards (e.g., INSPIRE EU Directive, ISO 19100 series), and the increasing need for improved data sharing strategies have lead to reconsider the technology used to organize and distribute the information. IRPI is confronted with the necessity to collect, maintain, update and use a large amount of geographical and temporal information, including maps at different scales showing the location of historical landslides and floods in Italy (http://sici.irpi.cnr.it), geomorphological, event and multi-temporal landslide inventory maps for selected geographical or administrative areas, maps showing the propensity that an area will be affected by slope failures in the future, maps of the expected temporal occurrence of landslides, maps showing levels of landslide risk to the population, and quasi-real-time assessments of the potential occurrence of rainfall-induced landslides based on rainfall measurements and forecasts, and on a empirical rainfall thresholds.

The new spatial infrastructure is being designed using Free and Open Source software for Geospatial data (FOSS4G). In particular, software used for storing, managing and publishing data include: PostgreSQL/PostGIS (a powerful RDBMS with spatial extension), Geoserver (a server written in Java that allows users to share and edit geospatial data), Geonetwork OS (a catalogue application to manage spatially referenced resources), ExtJS/GeoExt/OpenLayers (a cross-browser JavaScript libraries for building rich web mapping applications), and UNM MapServer (a platform for publishing spatial data and interactive mapping applications to the web). The spatial infrastructure is hosted on servers running RedHat Fedora Core OS. PostgreSQL and its geospatial extension PostGIS are used to store the geographical information, allowing for the efficient management of features and attributes, and access to the standard functionalities of a RDBMS (e.g., independence of data from application, security, physical and semantic data integrity). The Geonetwork open source suite was used to create and manage the metadata, and to provide a service for discovering maps and documents. WMS, WFS and WCS services were implemented using Geoserver; the styling of each data layer was designed using the GeoExt Styler extension. Power users can take advantage of the services using a simple GIS tools, integrating their own data with those provided by IRPI. ExtJSg and GeoExt/OpenLayer were used to design the Web-GIS interface used to portray the geospatial information. The tool allows end-users to browse through a wealth of information on landslides and floods in Italy.