



Hazard evaluation supported by spatial database and web-GIS

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The real-time evaluation of hazard associated to natural or man-made phenomena requires the management of geospatial and temporal data, most of them collected by using automatic monitoring systems. If a theoretical model for interpretation has been defined, these data are first used to validate and calibrate the model, and then to identify the areas influenced by the hazardous phenomena and for predicting their evolution. In order to prevent misleading results it is therefore essential to have a tool able of managing a large number of data for checking their reliability and for locating them in the space. This study focuses on the development of a spatial database and a web-GIS able to storage, validate and display the data to assist the decision makers in managing an Early Warning Systems (EWS). By developing a Sensor Observation Service (SOS) the database could be linked to the sensors (including geospatial data and manual measures), and the web-GIS could interact with users for displaying the data and collecting more additional information.

The database was set up by using PostgreSQL and Post GIS; the web-GIS displays the time series of data through graphs made with Open Flash Charts.

Special attention was paid in the development of procedures to assess the reliability of the measures. For this purpose the database includes all the information needed to describe the instrument performance, such as the sand pack size and casing diameter of open-standpipe piezometers for evaluating their time lag, and the calibration curves of transducers with the possibility of their updating. The position of the non-functioning instruments is identified through the analysis of the electrical signal and spatial displays, while the analyses of the redundancy and coherence of measures is used for detecting doubtful data.

Database and web-GIS was applied to the monitoring data of an embankment of the Adige River in Northern Italy. Measures of groundwater pressure, soil vertical displacements, soil and instrument temperature, meteorology and water level of the river were processed. To date the monitoring system has been used to support the research activities, and the database and the web-GIS has facilitated the analysis and data sharing.