



Management and publication of a continuously updated catalogue of geo-hydrological events with consequences to the population in Italy.

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Landslides and floods are widespread and recurrent phenomena in Italy, where they cause extensive damage and pose a severe threat to the population. To provide an estimate of geo-hydrological risk in Italy, a catalogue of landslide and flood events that caused damage to the population was compiled from a variety of different sources. These include the review of existing digital catalogues of historical events, supplemented by an extensive search of archive, bibliographical and chronicle sources. The new catalogue covers the 1943-year period from 68 AD to 2010, and lists 3,226 landslide events and 2,624 flood events that have resulted in deaths, missing persons, injured people, and homeless. For each event in the catalogue, different type of information was collected on the main physical features, as the precise or approximate date and site of occurrence, triggering mechanism , temporal and spatial evolution, and on the exact damage to the population, as the number of death, injured, missing and homeless. The research of geo-hydrological events and their consequence is a difficult, time consuming expensive, and uncertain operation. When this information is available many application are possible to determine the spatial and temporal frequency and the type and distribution of the damage. Such statistics are the basics for qualitative or quantitative risk evaluation which is fundamental in the land use planning and in civil protection fields. The management of data such as those described above must be made on storage systems that can provide guarantees of stability, security, interoperability, high capacity and high performance. It is also desirable that the system is able to handle geo-referenced data and that they are immediately available in the form of mapping services. For this purpose CNR IRPI has put in place a relational database based on PostgreSQL / PostGIS (an enterprise-class SQL database server with geographic extensions), a system for publishing data through standard OGC services (based on GeoServer) and a WebGIS (developed in-house and based on the services themselves). The system is implemented in 13 virtual machines on two host servers. To ensure high performance and capacity the database has been built using a logic of replication and load balancing. The data are edited by the operators, who access by alphanumeric and GIS clients, to the "master" database that is placed on the first host. An asynchronous replication is triggered when there is even a small change in the "master" database. The database replication takes place on two "slave" that are placed on a second host machine. A pooler for PostgreSQL placed between a battery of six GeoServers and the two "slave" database distributes the load of geographic call executed by GeoServers. A load balancer handles incoming calls to the six GeoServer nodes. The WebGIS, in turn, queries and publishes the information layers provided by the load balancer. This infrastructure, in addition to ensuring high capacity and performance, ensures that the data is replicated on two separate physical machines, so that there is no risk of data loss in connection with possible damage to hardware. The implemented system allows automatic updating and publication of maps relating the sites where landslide and flood events occurred causing damage to the population.