



Using online database for landslide susceptibility assessment with an example from the Veneto Region (north-eastern Italy).

Mario Floris, Cristina Squarzoni, Luca Zorzi, Andrea D'Alpaos, and Maria Iafelice

Department of Geosciences, University of Padua, via Giotto 1 – 35137 Padova (Italy);

Landslide susceptibility maps describe landslide-prone areas by the spatial correlation between landslides and related factors, derived from different kinds of datasets: geological, geotechnical and geomechanical maps, hydrogeological maps, landslides maps, vector and raster terrain data, real-time inclinometer and pore pressure data. In the last decade, thanks to the increasing use of web-based tools for management, sharing and communication of territorial information, many Web-based Geographical Information Systems (WebGIS) were created by local governments or nations, University and Research Centres. Nowadays there is a strong proliferation of geological WebGIS or GeoBrowser, allowing free download of spatial information. There are global Cartographical Portals that provide a free download of DTM and other vector data related to the whole planet (<http://www.webgis.com>). At major scale, there are WebGIS regarding entire nation (<http://www.agiweb.org>), or specific region of a country (<http://www.mrt.tas.gov.au>), or single municipality (<http://sitn.ne.ch/>). Moreover, portals managed by local government and academic government (http://turtle.ags.gov.ab.ca/Peace_River/Site/) or by a private agency (<http://www.bbt-se.com>) are noteworthy.

In Italy, the first national projects for the creation of WebGIS and web-based databases begun during the 1980s, and evolved, through years, to the present number of different WebGIS, which have different territorial extensions: national (Italian National Cartographical Portal, <http://www.pcn.minambiente.it>; E-GEO Project, <http://www.egeo.unisi.it>), interregional (River Tiber Basin Authority, www.abtevere.it), and regional (Veneto Region, www.regione.veneto.it). In this way we investigated most of the Italian WebGIS in order to verify their geographic range and the availability and quality of data useful for landslide hazard analyses. We noticed a large variability of the accessing information among the different browsers. In particular, the Trento and Bolzano Provinces Geobrowsers (<http://www.provincia.bz.it>; <http://www.territorio.provincia.tn.it>) provide a large availability of data respect to the other regional and interregional WebGIS, which generally allow only the download of topographic data. Recently, the Italian Institute for Environmental Protection and Research, ISPRA (Istituto Superiore per la Protezione e la ricerca Ambientale), makes available and free usable the Italian Inventory of Landslides (IFFI Project). The inventory contains information derived from the census of all the instability phenomena in Italy, offering a base-cognitive instrument for the landslide hazard evaluation.

For the landslide hazard assessment it is essential to evaluate the real effectiveness of the available data. Hence, we test the effectiveness of the web databases to evaluate the landslides susceptibility in the Euganean Hill Regional Park (185.5 km²), located at SE of Padua (Veneto Region, Italy). We used data available from three online spatial databases: Veneto Region Cartographic Portal (<http://www.regione.veneto.it>), for vector terrain data at 1:5000 scale; the IFFI archive (<http://www.sinanet.apat.it>), for information concerning landslides; and the National Cartographic Portal of the Italian Ministry of Environment (<http://www.pcn.minambiente.it>), for the multi-temporal orthophotos. The landslide susceptibility was evaluated using a simple probabilistic analysis considering the relationships between landslides and DEM-derived factors, such as slope, curvature and aspect. For the validation of the analysis, we made a spatial test by subdividing the study area in two sectors: training area and test area. The obtained results show that the actual no-completeness of online available spatial databases related to the Veneto Region allows only regional and medium scale (>1:25,000) susceptibility analysis. Data about lithology, land use, groundwater and others relevant factors are absent. In addition, the lack of data on the temporal evolution of the landslides permits only a spatial analysis, impeding a complete evaluation of the landslide hazard.