HELI-DEM portal for geo-processing services

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HELI-DEM (Helvetia-Italy Digital Elevation Model) is a project developed in the framework of Italy/Switzerland Operational Programme for Trans-frontier Cooperation 2007-2013 whose major aim is to create a unified digital terrain model that includes the alpine and sub-alpine areas between Italy and Switzerland. The partners of the project are: Lombardy Region, Piedmont Region, Polytechnic of Milan, Polytechnic of Turin and Fondazione Politecnico from Italy; Institute of Earth Sciences (SUPSI) from Switzerland.
The digital terrain model has been produced by integrating and validating the different elevation data available for the areas of interest, characterized by different reference frame, resolutions and accuracies: DHM at 25 m resolution from Swisstopo, DTM at 20 m resolution from Lombardy Region, DTM at 5 m resolution from Piedmont Region and DTM LiDAR PST-A at about 1 m resolution, that covers the main river bed areas and is produced by the Italian Ministry of the Environment. Further results of the project are: the generation of a unique Italian Swiss geoid with an accuracy of few centimeters (Gilardoni et al. 2012); the establishment of a GNSS permanent network, prototype of a transnational positioning service; the development of a geo-portal, entirely based on open source technologies and open standards, which provides the cross-border DTM and offers some capabilities of analysis and processing through the Internet.

With this talk, the authors want to present the main steps of the project with a focus on the HELI-DEM geo-portal development carried out by the Institute of Earth Sciences, which is the access point to the DTM outputted from the project.

The portal, accessible at http://geoservice.ist.supsi.ch/helidem, is a demonstration of open source technologies combined for providing access to geospatial functionalities to wide non GIS expert public. In fact, the system is entirely developed using only Open Standards and Free and Open Source Software (FOSS) both on the server side (services) and on the client side (interface). In addition to self developed code the system relies mainly on teh software GRASS 7 [1], ZOO-project [2], Geoserver [3] and OpenLayers [4] and the standards WMS [5], WCS [6] and WPS [7].

At the time of writing, the portal offers features like profiling, contour extraction, watershed delineation and analysis, derivatives calculation, data extraction, coordinate conversion but it is evolving and it is planned to extend to a series of environmental modeling that the IST developed in the past like dam break simulation, landslide run-out estimation and floods due to landslide impact in artificial basins.

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