



Geothematic maps for landslide hazard management in the Serchio River Basin (Northern Tuscany, Italy).

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The knowledge of the distribution and occurrence of landslide processes as well as the geological setting is essential to define the hydrogeological hazard in a river catchment. Therefore, dynamic and easily updatable geographic database are necessary to handle and represent data in land use planning and management. Thus, in agreement with the Serchio River Basin Authority (Northern Tuscany, Italy), a geodatabase was developed by means of ArcGIS - ArcInfo® 9.0 (ESRI, 2004) and implemented to complete and homogenize the previously produced landslide record (Autorità di Bacino del Fiume Serchio, 2000), to create easy updatable GIS features, and to produce landslide maps scale 1:10.000.

Starting from published and unpublished geological and geomorphological records of the Serchio River Basin, data were loaded in different feature classes previously implemented in the geodatabase. Two main datasets were distinguished: solid geology and superficial deposits (consisting in debris, landslide bodies, etc.). Stratigraphical and tectonic contacts under superficial deposits were inferred and digitized where necessary and spatial analysis was performed to reconstruct the polygonal geometry for solid geology. This allows displaying superficial deposits as an editable additional layer on top of stand-alone solid geology maps. Moreover, the geomorphological features were linked to the IFFI (*Inventory of Italian Landslide Processes*; APAT, 2005) by means of an appropriate field in the attribute table of the superficial deposits.

Areas potentially prone to landslide due to lithological conditions and areas instable because of the occurrence of deep seated landslide were locally defined at the scale

1:10000 on the basis of the geomechanical characteristics of the geological formations outcropping in the Serchio River Basin. The definition of highly instable areas due to morphological features was derived through automatic ArcGIS 9.0 Model Builder procedures. The results of the analysis were implemented in a dedicated feature class and displayed in landslide geothematic maps, scale 1:10000.

Finally, these maps have been published on-line using ESRI Map Server ArcIMS[®] 9.1 (ESRI, 2005). Users may decide to interactively display either solid geology, superficial deposits, or the areas prone to landslide. Being also a tool for land use planning and management for the Serchio River Basin Authority, the geodatabase will help in performing analysis of landslide occurrence in order to define quantitatively landslide susceptibility over the whole catchment.

References

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