



SHAKE UP II - A tool for hydrological and geological characterization and flood hazard evaluation in the upland Adda basin, Central Alps

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In the mountain watershed of Adda river there is a huge historical record of landslides and severe flood events that caused casualty to the population and large damage to infrastructures, these including a complex dam system designed for hydropower exploitation. This led the public authorities to finance SHAKE UP II project, in order to achieve the detailed and comprehensive hydrological and geological characterization of the area, this including the associated flood hazard for the upland Adda basin with high spatial detail. The Regional Hydrological Service of Lombardia at ARPA, jointly with Politecnico di Milano, CNR IEIIT Bologna and ERSAF (an agricultural public agency) has accomplished distributed maps of potential absorption capacity (using the SCS Curve Number method), soil erosion rate (using the RUSLE model), high resolution digital elevation model (20 m gridded topography), rainfall intensity duration frequency area curves, sub-basin boundaries up to 30 hectares, and the drainage network, both natural and artificial. The historical peak-discharge series were used to evaluate flood hazard in gauged basins using an hybrid approach including regional flood frequency analysis for the South-Central Alps, and regional analysis was further developed to estimate flood hazard in ungauged network nodes. Finally a specific software tool (i.e. SHAKEUPII) was implemented within the framework of GRASS GIS environment in order to manage these maps, and to make hydrological computations. Simply clicking on a point on the map, one can obtain all the parameters and statistics for the upstream basin. This allows to manage the system in continuous space over the examined area of about 2000 square kilometers, so obtaining the required information on flood hazard for both gauged and ungauged river site with high spatial detail.