A GEOMORPHOLOGICAL APPROACH TO ESTIMATE LANDSLIDE HAZARD AND RISK IN URBAN AND SUB-URBAN AREAS: EXAMPLES FROM THE UMBRIA REGION.

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Evaluating landslide hazard and the associated risk in urban and sub-urban areas is a challenging task. For the Umbria Region, an area with a long history of mass movements that extends for about 9000 km^2 in Central Italy, we developed a methodology to evaluate landslide hazard and risk in 80 urban and sub-urban areas. For each of the 80 sites selected by the Regional Government, landslide hazard was ascertained based on the interpretation of aerial photographs of various vintages (1947, 1954-55, 1978, 1993, 1997) and scales (from 1:13,000 to 1:35.000). The availability of aerial photographs of different dates that covered a period of about 50 years allowed to perform a multi-temporal investigation of the slopes each site, and to define the most active landslide areas. These were also identified as the most hazardous sites. Since no detailed information on vulnerable elements was available to us, we prepared a simple map showing houses, buildings, roads, railroads, power lines, etc. based on the available topographic maps (at 1:10,000 scale) and the most recent set of aerial photographs at each site. The elements at risk were then identified in a GIS intersecting the hazard and vulnerability maps. Levels of risk were then ranked based on the spatial (abundance) and temporal (recurrence) frequency of landslides at each site. The methodology was developed under contract for the Regione dell'Umbria and the Tiber River Basin Authority. Albeit still in its infancy, the proposed method to define landslide hazard and risk proved reliable and cost effective, and will soon be extended to other sites in the Region.