



PRELIMINARY MAP OF LANDSLIDE AND FLOOD HAZARDS AND RISK IN ITALY

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The assessment of landslide and flood hazards at the national scale has been attempted a few times with mixed, often unsatisfactory results. The main difficulty of such attempts lies in the scant availability of relevant information for territories extending for hundreds of thousands of square kilometres. Most of the previous attempts were heuristic, and based on historical inventories coupled with the experience of the investigators. As a result, most of the hazard assessments were subjective, qualitative, and of little practical use. In Italy, relevant information has become available to attempt a quantitative and objective nationwide assessment of landslide and flood hazards, and of the associated risk. We have prepared a preliminary map showing the estimated levels of landslide and flood hazards for the whole Italy, which extends for 301,338 square kilometres. The map shows hazard levels for the 8103 Italian municipalities. Landslide and flood hazard are portrayed in 5 classes, from very low to very high. To evaluate the hazards we used an historical catalogue listing 61,995 damaging events in Italy, of which 22,547 were landslide events and 27,801 were flood events in the period between 1900 and 2001. We obtained the average recurrence of landslide and flood events in each municipality dividing the total number of events listed in the historical catalogue (from 0 to 353) by the time span of the investigated period (102 years). Assuming that the recurrence of landslides and floods will remain the same for the future, and adopting a probability model (Poisson), we determine for different time intervals the exceedance probability of having one or more damaging landslide or flood in each municipality. We obtained the spatial assessment of landslide and flood

hazard by multivariate analysis of morphological variables obtained from a 90x90 meter digital elevation model (DEM) acquired by the Shuttle Radar Topography Mission (SRTM) in February of 2000. The DEM was produced by NASA Jet Propulsion Laboratory and distributed through the U.S. Geological Survey EROS Data Center. Lastly, we obtained an estimate of the magnitude of the expected damaging landslide or flood event in each municipality by analyzing the frequency statistics of historical events with human consequences. For the purpose we used a catalogue of landslides and floods that occurred in Italy between AD 1279 and 2002 and caused deaths, missing persons, injuries and homelessness. To determine levels of landslide and flood risk we intersected the maps of landslide and flood hazards with maps showing the number and the density of population in each municipality. The result is a preliminary, quantitative estimate of landslide and flood risk in Italy. The maps, albeit still preliminary prototypes, are remarkable and can be used by national and regional civil protection authorities, by national and regional environmental agencies, and by insurance and re-insurance companies.