



COMBINING HISTORICAL AND GEOMORPHOLOGICAL INFORMATION TO INVESTIGATE EARTHQUAKE INDUCED LANDSLIDES

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Landslides are caused by many different triggers, including earthquakes. In Italy, a detailed new generation catalogue of information on historical earthquakes for the period 461 B.C to 1997 is available (Catalogue of Strong Italian Earthquakes from 461 B.C. to 1997, ING-SGA 2000). The catalogue lists 548 earthquakes and provides information on a total of about 450 mass-movements triggered by 118 seismic events. The information on earthquake-induced landslides listed in the catalogue was obtained through the careful scrutiny of historical documents and chronicles, but was rarely checked in the field. We report on an attempt to combine the available historical information on landslides caused by earthquakes with standard geomorphological techniques, including the interpretation of aerial photographs and field surveys, to better determine the location, type and distribution of seismically induced historical slope failures.

We present four examples in the Central Apennines. The first example describes a rock slide triggered by the 1279 April 30 Umbria-Marche Apennines earthquake (Io = IX) at Serravalle, along the Chienti River (Central Italy). The landslide is the oldest known earthquake-induced slope failure in Italy. The second example describes the location of 2 large landslides triggered by the 1584 September 10 earthquake (Io = IX) at San Piero in Bagno, along the Savio River (Northern Italy). The landslides were subsequently largely modified by mass movements occurred on 1855 making the recognition of the original seismically induced failures difficult, if not impossi-

ble. In the third example we present the geographical distribution of the available information on landslide events triggered by 8 earthquakes in Central Valnerina, in the period 1703 to 1979. A comparison with the location of landslides triggered by the September-October 1997 Umbria-Marche earthquake sequence is presented. The fourth example describes the geographical distribution of the available information on landslides triggered by the great 1915 January 13 Marsica (Central Italy) earthquake ($I_0 = XI$) mostly along the Liri River valley. Problems encountered in matching the recent historical information with the local geomorphological setting are discussed. A critical analysis of the four studied examples allows general considerations on the advantages and limitations of a combined historical and geomorphological approach to investigate past earthquake induced landslides. Lastly, a preliminary analysis of the relationship between the earthquake intensity and the distance of the known slope failures to the triggering earthquake epicentres is presented, for the four investigated areas and for the entire catalogue of historical earthquakes.