



## **The influence of land use change on landslide susceptibility zonation: the Briga catchment test site (Messina, Italy)**

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Landslides spatial distribution and frequency are the consequence of different meteorological conditions, the land use and environmental settings including topographical, morphological, hydrological, lithology. Lithology and structure change over periods of millions of years, morphology varies rapidly or over a period of centuries if mass wasting processes are consistent, climate, and land use change seasonally or over a period of decades.

In this work we have attempted to evaluate the influence of land use change in a period of about 60 years on landslide spatial distribution occurrence (susceptibility) for the Briga catchment test site.

The Briga basin is located along the Ionian coast of Sicily (SW of Messina, Italy). On 1 October 2009, the area was hit by a high intensity rainfall event that triggered abundant slope failures, and resulted in widespread erosion and deposition of debris along ephemeral drainage channels. After the storm, an accurate event landslide inventory map was made for the catchment and a pre-event landslide map was prepared using aerial photographs. For the test area two different land use maps were realized. The first was obtained through a semi-automatic classification of a digitized aerial photographs acquired during the year 1954, the second through the combination of supervised classifications of two QuickBird images acquired in 2006 and 2009.

Exploiting the two different land use maps, different susceptibility zonations were prepared through a multivariate statistical analysis of a set of morphological and land use information. Differences in the susceptibility models were analyzed to identify: i) land use change effects on the landslide susceptibility; ii) the influence of human action on the land use change and iii) the consequences of land use change on landslide vulnerability and risk.

Preliminary results show an overall increase of the susceptibility, probably due to the increase of bare soil to the detriment of forested areas, mainly in correspondence of pre-existing and new urban areas.