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Analysis of the relationship between landslides size distribution and earthquake source area

Andrea Valagussa (1), Giovanni B. Crosta (1), Paolo Frattini (1), and Chong Xu (2)

(1) Universita' degli Studi di Milano - Bicocca, Earth and Environmental Sciences, Milano, Italy (paolo.frattini@unimib.it, +39 02 6448 2073), (2) Institute of Geology, China Earthquake Administration, Chaoyang District, Beijing, P.R.China

The spatial distribution of earthquake induced landslides around the seismogenetic source has been analysed to better understand the triggering of landslides in seismic areas and to forecast the maximum distance at which an earthquake, with a certain magnitude, can induce landslides (e.g Keefer, 1984).

However, when applying such approaches to old earthquakes (e.g 1929 Buller and 1968 Iningahua earthquakes New Zealand; Parker, 2013; 1976 Friuli earthquake, Italy) one should be concerned about the undersampling of smaller landslides which can be cancelled by erosion and landscape evolution. For this reason, it is important to characterize carefully the relationship between landslide area and number with distance from the source, but also the size distribution of landslides as a function of distance from the source.

In this paper, we analyse the 2008 Wenchuan earthquake landslide inventory (Xu et al, 2013). The earthquake triggered more than 197,000 landslides of different type, including rock avalanches, rockfalls, translational and rotational slides, lateral spreads and derbies flows.

First, we calculated the landslide intensity (number of landslides per unit area) and spatial density (landslide area per unit area) as a function of distance from the source area of the earthquake. Then, we developed magnitude frequency curves (MFC) for different distances from the source area. Comparing these curves, we can describe the relation between the distance and the frequency density of landslide in seismic area.

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