

## Co-seismic landslide crest clustering investigated in three large earthquake epicentral areas

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The 1994 Northridge earthquake, the 1999 Chichi earthquake and the 2008 Wenchuan earthquakes triggered several thousands of landslides in their epicentral area. The position of landslides on hillslopes was determined using a proper normalization for statistical bias. We identify a co-seismic signature in the landslides position (i.e. crest clustering). The use of rainfall-induced landslide inventories confirms that crest-clustering is specific to seismictriggering. We thus present the pattern of crest clustering for the three cases and relate it to lithologic, geomorphic, and ground motion parameters. At the scale of the epicentral area, we identify that crest clustering does clearly occur along the fault where the shaking is strong. It seems to decrease with distance to source following the high frequency content of seismic waves. Surprisingly smooth small scale reliefs seems to be more affected by crest clustering than sharper and larger reliefs (negative relations with the shape ratio, slope length, relative elevation and curvature) is highlighted. These results moderate the idea that the crest clustering is explained by topographic amplification.