Geophysical Research Abstracts
Vol. 16, EGU2014-6717, 2014
EGU General Assembly 2014

Into the complexity of coseismic landslide clustering

Patrick Meunier (1), Odin Marc (2), Taro Uchida (3), and Niels Hovius (2)

(1) Ecole Normale Supérieure, Laboratoire de Géologie, Paris, France (meunier@geologie.ens.fr), (2) Helmholtz-Zentrum Potsdam, Deutsches GeoForschungsZentrum GFZ, Potsdam, Germany, (3) National Institute for Land and Infrastructure Management, Research Center for Disaster Risk Management

Earthquake-triggered landslides tend to cluster along topographic crests while rainfall-induced landslides are more uniformly distributed on hillslopes [1]. In theory, rainfall induced landslides should even occur downslope preferentially, where pore pressure induced by groundwater flows is the highest. Past studies on landslide clustering are all based on the analysis of complete dataset or subdataset of landslides associated with a given event (seismic or climatic) as a whole. In this work, we document the spatial variation of the landslide position (on hillslopes) within the epicentral area for the cases of the 1999 Chichi, the 2004 Niigata and the 2008 Iwate earthquakes. We show that landslide clustering is not uniform in space and exhibit patterns that vary a lot from one case to another. These patterns are not easy to interpret as they don't seem to be controlled by a single governing parameter but result from a complex interaction between local (hillslope length and gradient, lithology) and seismic (distance to source, slope aspect, radiation pattern, coseismic uplift) parameters.

[1] Meunier, P., Hovius, N., & Haines, J. A. (2008). Topographic site effects and the location of earthquake induced landslides. Earth and Planetary Science Letters, 275(3), 221-232.