Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10032, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10032
EGU General Assembly 2008

Constraints on the location of earthquake- and storm-triggered landslides on slopes

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We focus on the properties of the earthquake- and storm-triggered landslides populations in Taiwan, in California, in New-Zealand and in Papua-New-Guinea. Seismically-induced ground failures, in California, in Taiwan and in the Finisterre Mountains, tend to cluster along the ridge crests (56% of the Northridge earthquake-induced landslides were triggered on the upper quarter of the slopes) while storm-triggered landslides in New-Zealand and Taiwan are more uniformly distributed with respect to their location on slopes. The presence of inner gorges, in the Finisterre, induces landslide clustering at the base of the slopes.
Clustering on crests observed in the Earthquake-triggered landslide populations is a direct consequence of the complex (de)amplification processes induced by heterogeneity of the medium. With help of a numerical model of wave propagation (Impedance operator method), we focus on the perturbation of the ground motion pattern induced by topography with the case of P and S wave pulses [0-6Hz] travelling along a generic 2D topographic profile extracted from the Finisterre Mountains DEM. Amplification modelled around the crest, but also in the inner gorges, are in good agrement with the observed landslide clustering pattern.