Geophysical Research Abstracts
Vol. 12, EGU2010-13410-1, 2010
EGU General Assembly 2010


# Geological control of earthquake induced landslide in El Salvador

Meaza TSIGE AGA
COMPLUTENSE DE MADRID, FACULTY OF GEOLOGY, GEODYNAMICS, MADRID, Spain (meaza@geo.ucm.es)

Geological control of earthquake induced landslides in El Salvador.

M., Tsige(1), I., Garcia-Flórez(1), R., Mateos(2)

(1)Universidad Complutense de Madrid, Facultad de Geología, Madrid, Spain, (meaza@geo.ucm.es)
(2)IGME, Mallorca

El Salvador is located at one of the most seismically active areas en Central America, and suffered severe damage and loss of life in historical and recent earthquakes, as a consequence of earthquake induced landslides. The most common landslides were shallow disrupted soil-slides on steep slopes and were particularly dense in the central part of the country. Most of them are cited in the recent mechanically weak volcanic pyroclastic deposits known as “Tierra Blanca” and “Tierra Color Café” which are prone to seismic wave amplification and are supposed to have contributed to the triggering of some of the hundreds of landslides related to the 2001 (Mw = 7.6 and Mw = 6.7), seismic events. The earthquakes also triggered numerous deep large scale landslides responsible for the enormous devastation of villages and towns and are the source for the current high seismic hazard as well. Many of these landslides are located at distances more than 50 and 100 km from the focal distance, although some of them occurred at near field. Until now there has been little effort to explain the causes and concentration of the deep large-scale landslides especially their distribution, failure mechanism and post-rapture behavior of the landslide mass (long run-out). It has been done a field investigation of landslides, geological materiales and interpretation of aerial photographs taken before and after the two 2001 (Mw= 7.6 and Mw= 6.7) El Salvador earthquakes. The result of the study showed that most of the large-scale landslides occured as coherent block slides with the sliding surface parallel to a pre-existing fractures and fault planes (La Leona, Barriolera, El Desague, Jiboa landslides). Besides that the pre-existing fractures are weak zones controlling the mechanism and size of the slide, they may become the centre of seismic wave guiding and therefore of seismic energy entrapment producing a larger ground movement. On the other hand, the flow-like behavior of the landslide mass after failer is suggested to be controlled by the nature of the geological and geotechnical aspects of the materials. After seismic shaking the landslide mass mobilizes downslope up to hundreds of meters. This mobilization seemed to be due to a large deformation as a consecuence of structure colapse during seismic shaking. These generally are Miocene to Quaternary-aged thick volcanic pyroclasts, fall deposits and breccted tuffs inter-beded frequently by a thin volcanic ash. They consist of 50-60 per cent silt and sand particles with a few amount of clay which are evolving large andesitic blocks. Have a very open texture with a high void ratio and low density which confers an anomalous post-failure deformation.
At their in situ state these materials possess high apparent strength due to primary weak chemical and silty-clay cementation but they are susceptible to large reductions in their strength due to shaking and flow like a semi-liquid mass (quick-silt), so that the mass will long run-out.