



Assessment of earthquake-induced landslides hazard in El Salvador after the 2001 earthquakes using macroseismic analysis

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Two strong earthquakes and a number of smaller aftershocks struck El Salvador in the year 2001. The January 13 2001 earthquake, Mw 7.7, occurred along the Cocos plate, 40 km off El Salvador southern coast. It resulted in about 1300 deaths and widespread damage, mainly due to massive landsliding. Two of the largest earthquake-induced landslides, Las Barioleras and Las Colinas (about 2×10^5 m³) produced major damage to buildings and infrastructures and 500 fatalities. A neighborhood in Santa Tecla, west of San Salvador, was destroyed. The February 13 2001 earthquake, Mw 6.5, occurred 40 km east-southeast of San Salvador. This earthquake caused over 300 fatalities and triggered several landslides over an area of 2,500 km² mostly in poorly consolidated volcanoclastic deposits. The La Leona landslide ($5-7 \times 10^5$ m³) caused 12 fatalities and extensive damage to the Panamerican Highway. Two very large landslides of 1.5 km³ and 12 km³ produced hazardous barrier lakes at Rio El Desague and Rio Jiboa, respectively. More than 16,000 landslides occurred throughout the country after both quakes; most of them occurred in pyroclastic deposits, with a volume less than 1×10^3 m³.

The present work aims to define the relationship between the above described earthquake intensity, size and areal distribution of induced landslides, as well as to refine the earthquake intensity in sparsely populated zones by using landslide effects. Landslides triggered by the 2001 seismic sequences provided useful indication for a realistic seismic hazard assessment, providing a basis for understanding, evaluating, and mapping the hazard and risk associated with earthquake-induced landslides.