



## **Assessment of earthquake- triggered landslides in El Salvador based on an Artificial Neural Networks (ANN) model**

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Landslide hazard studies are appropriate for evaluation and mitigation plan development in potential areas for the occurrence of landslides. There are several techniques available for landslide hazard research, however statistical approaches provide rigorous analysis to assess landslide hazard over large regions. This study is an approach for assessing earthquake-triggered landslides hazard using artificial neural networks (ANN). The computational method for the training process is a back-propagation learning algorithm. It is applied to El Salvador, one of the most seismically active regions in Central America, where the last severe destructive earthquakes occurred in January 13th (Mw 7.7) and February 13th, 2001, (Mw 6.6). The first of these earthquakes triggered more the 500 landslides, included the most tragic in Las Colinas landslide, and killed at least 844 people.

The ANN is designed and trained for the developing landslide susceptibility analysis techniques at a regional scale. This approach uses an inventory of landslides and different parameters of slope instability: slope gradient, elevation, aspect, mean annual precipitation, lithology, land use, and terrain roughness. The obtained ANN is applied in combination with a Geographic Information System (GIS) for landslide susceptibility mapping.

A previous logistic regression analysis was done, taking as independent variables the same parameters considered in the neural network, while the occurrence or non-

occurrence of landslides is considered as dependent variable, which determined the importance of terrain roughness and soil type as key factors within the model.

The results of the landslide susceptibility analysis are checked using landslide location data. These results show a high concordance between the landslide inventory and the high susceptibility estimated zone. Finally, we make a comparative analysis of statistics techniques, logistic regression and artificial neural network.