Natural Hazards and Earth System Science
An Open Access Journal of the European Geosciences Union







Nat. Hazards Earth Syst. Sci., 10, 1307-1315, 2010
www.nat-hazards-earth-syst-sci.net/10/1307/2010/
doi:10.5194/nhess-10-1307-2010


# Assessment of earthquake-triggered landslide susceptibility in El Salvador based on an Artificial Neural Network model

M. J. García-Rodríguez[1] and J. A. Malpica[2]
[1]Universidad Politécnica de Madrid, Escuela Técnica Superior de Ingenier Topografía, Geodesia y Cartografía (ETSITGC), Departamento de Ingeni Topográfica y Cartografía, Madrid, Spain
[2]Universidad de Alcalá, Escuela Politécnica, Departamento de Matemática Madrid, Spain

Abstract. This paper presents an approach for assessing earthqua triggered landslide susceptibility using artificial neural networks (AI The computational method used for the training process is a back-propagation learning algorithm. It is applied to El Salvador, one of seismically active regions in Central America, where the last severe destructive earthquakes occurred on 13 January 2001 ($M_w$ 7.7) an February 2001 ($M_w$ 6.6). The first one triggered more than 600 lan (including the most tragic, Las Colinas landslide) and killed at least people.

The ANN is designed and programmed to develop landslide suscep analysis techniques at a regional scale. This approach uses an inve landslides and different parameters of slope instability: slope grad elevation, aspect, mean annual precipitation, lithology, land use, a terrain roughness. The information obtained from ANN is then use Geographic Information System (GIS) to map the landslide suscept a previous work, a Logistic Regression (LR) was analysed with the parameters considered in the ANN as independent variables and t occurrence or non-occurrence of landslides as dependent variables result, the logistic approach determined the importance of terrain roughness and soil type as key factors within the model. The resul landslide susceptibility analysis with ANN are checked using landsli location data. These results show a high concordance between th landslide inventory and the high susceptibility estimated zone. Fina comparative analysis of the ANN and LR models are made. The adv and disadvantages of both approaches are discussed using Receiv Operating Characteristic (ROC) curves.

Full Article (PDF, 1577 KB)

Citation: García-Rodríguez, M. J. and Malpica, J. A.: Assessment of earthquake-triggered landslide susceptibility in El Salvador based Artificial Neural Network model, Nat. Hazards Earth Syst. Sci., 10, 1 1315, doi:10.5194/nhess-10-1307-2010, 2010. Bibtex EndNote Reference Manager XML