Development of Landslides Susceptibilty Maps using Artificial Neural Networks and Weigth of Evidence Method in Quebrada Lo Canas, Chile (33,5, 71,5) using GRASS GIS

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Abstract

Santiago, the Capital City of Chile with 5 million of citizens, is located in the Central Depression, a morphological unit which is surrounded towards the east by the western border of Los Andes Mountain. This border is apparently active until now. This geological setting is very favourable for the development of different instabilities and mass movements and therefore it is necessary to evaluate landslides hazard.

The critical set of parameters to evaluate landslides occurrence is the type of rocks or soils, geological structures, topography (slope angle, aspect, curvature) and vegetation. Additionally, zones where these kind of phenomena have been registered in the past show a high susceptibility to continue suffering landslides.

The determination of landslides susceptibility in large areas can be analyzed with different methods of spatial analysis by means of a geographic information system (GIS). In this work, artificial neural networks and the Weight of Evidence Method, were used to generate a susceptibility map. This procedure was applied in Quebrada Lo Canas area, located in the eastern part of Santiago.

Map of scars of landslides (evidence map) obtained from the analysis of aerial photographs and satellite images and maps of conditioning factors, like soil, lithology, slope, aspect, curvature, structures and vegetation were produced. These maps were digitized and analyzed using GRASS GIS 5.0.3. In this paper, the theory and implementation of this methodology is presented.

Keywords: Landslide Susceptibility, Artificial Neural Networks, Weight of evidence Method.