Geophysical Research Abstracts
Vol. 14, EGU2012-2445, 2012
EGU General Assembly 2012

Contribution of physical modelling to climate-driven landslide hazard mapping: an alpine test site

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The aim of this work is to develop a methodology for integrating climate change scenarios into quantitative hazard assessment and especially their precipitation component. The effects of climate change will be different depending on both the location of the site and the type of landslide considered. Indeed, mass movements can be triggered by different factors. This paper describes a methodology to address this issue and shows an application on an alpine test site.

Mechanical approaches represent a solution for quantitative landslide susceptibility and hazard modeling. However, as the quantity and the quality of data are generally very heterogeneous at a regional scale, it is necessary to take into account the uncertainty in the analysis. In this perspective, a new hazard modeling method is developed and integrated in a program named ALICE. This program integrates mechanical stability analysis through a GIS software taking into account data uncertainty. This method proposes a quantitative classification of landslide hazard and offers a useful tool to gain time and efficiency in hazard mapping. However, an expertise approach is still necessary to finalize the maps. Indeed it is the only way to take into account some influent factors in slope stability such as heterogeneity of the geological formations or effects of anthropic interventions.

To go further, the alpine test site (Barcelonnette area, France) is being used to integrate climate change scenarios into ALICE program, and especially their precipitation component with the help of a hydrological model (GARDENIA) and the regional climate model REMO (Jacob, 2001). From a DEM, land-cover map, geology, geotechnical data and so forth the program classifies hazard zones depending on geotechnics and different hydrological contexts varying in time.

This communication, realized within the framework of Safeland project, is supported by the European Commission under the 7th Framework Programme for Research and Technological Development, Area “Environment”, Activity 1.3.3.1 “Prediction of triggering and risk assessment for landslides”.