Geophysical Research Abstracts
Vol. 14, EGU2012-2437, 2012
EGU General Assembly 2012

Effects of changes in land use and management on landslide processes induced by water under semi-arid Mediterranean and humid tropical conditions

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Under particular climate conditions, the hydrological processes in sloping lands leading to landslides induced by water are affected both by the soil properties and by the use and management of the land. Frequently, the influence of changes in use and management of the land is even more important than the changes in climate, associated or not to global changes, in increasing the risks or triggering landslides. In this contribution there are presented two cases of landslides triggered by hydrological changes induced by changes in land use and management, under semi-arid mediterranean climate conditions (terracing of dry land vineyards in NE Spain) and under humid tropical climate conditions (deforestation and change to overgrazed grassland in W Venezuela). There are shown the induced soil and land hydrological changes in each case, both evaluated in situ under field conditions and using the simulation model SOMORE developed by the author. This model, based on hydrological processes evaluated in situ, has been successfully used for predicting the changes in soil water regime and soil water balance, and to deduce their effects on problems related with water supply to plants, runoff, surface erosion, mass erosion (landslides), and flooding, under different climate and land use and management. From that we may be able both to predict the probabilities and risks of landslides under the present and previewed changing climatic conditions, and to select and apply the best land use and management practices to prevent them. The structure of this non empirical hydrological model is also presented.