Landslide hazard GIS mapping in areas with very limited information about triggering factors: two cases study in the Betic Cordillera (Spain)

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Abstract

The assessment of landslide hazard and risk it is widely based on GIS applications from which a wide variety of maps, tables of data, sensibility analysis, documents and reports may be obtained. While landslide susceptibility mapping results from a given spatial analysis of correlation between a landslide inventory and the distribution of several significant determining factors, landslide hazard mapping needs temporal information about the triggering factors and in order to obtain landslide risk maps it is necessary first to take in account information about size, speed, degree of development of the landslide and then data about the element of the territory which eventually could be damaged as its vulnerability, cost, etc.. Nevertheless, in many regions landslides usually were, or are, reported as a part of local or regional inventories with its spatial or geo-referred data. The basic temporal data about the precise triggering factor, its date or the landslide type, size, speed and consequences are frequently badly established when not completely lacking in regions were there are no established system to collect that information, usually because of the absence of any institution responsible to deal with that topic with the necessary detail. In such situations of limited information, which are quite extended in many countries including Europe, some reasonable simplifications should be assumed in the general methodology which is being collectively performed by a number of authors with a common base on pioneering contributions made since the early 1970´s and along the last forty years by E.E.Brabb, D.Varnes, R.Fell, A.Carrara and many others. In this paper a GIS method is proposed which introduces this simplified assessment intended to fulfil the mentioned limitations of the available information. The method is based largely on published papers and regional experience on landslide researches developed in the Betic Cordillera (Southern Spain) along the last 25 years.