



Analysis of economic vulnerability to flash floods in urban areas of Castilla y León (Spain)

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The growth of exposed population to floods, the expansion in allocation of economical activities to flood-prone areas and the rise of extraordinary event frequency over the last few decades, have resulted in an increase of flash flood-related casualties and economic losses. The increase in these losses at an even higher rate than the increase of magnitude and frequency of extreme events, underline that the vulnerability of societies exposed is a key aspect to be considered. Vulnerability is defined as the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of a community to the impact of hazards such as floods, being flash floods one of the natural hazards with the greatest capacity to generate risk. In recent years, numerous papers have deal with the assessment of the social dimension of vulnerability.

However, economic factors are often a neglected aspect in traditional risk assessments which mainly focus on structural measures and flood damage models. In this context, the aim of this research is to identify those economic characteristics which render people vulnerable to flash flood hazard, and consider whether these characteristics are identifiable as local patterns at regional level. The result of this task is an Economic Vulnerability Index (EVI) based on susceptibility profiles of the population per township. These profiles are obtained by Hierarchical Segmentation and Latent Class Cluster Analysis of economic information provided by different public institutional databases.

The methodology proposed here is implemented in the region of Castilla y León (94,230 km²), placed in Central-Northern Spain. Townships included in this study meet two requirements: i) urban areas are potentially affected by flash floods (i.e. villages are crossed by rivers or streams with a longitudinal slope higher than 0.01 m m⁻¹); ii) urban areas are affected by an area with low or exceptional probability of flooding (as provided by Directive 2007/60/EC of 23 October 2007 on the assessment and management of flood risks) according with the preliminary assessment of flood risk made by water authorities.