



## **Integration of social dimension in an index oriented methodology for consequence analysis of natural hazards: application to the Upper Guil Catchment (Southern French Alps)**

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Vulnerability assessment together with hazard exposure is generally accepted as the two main steps of risk analysis. If quantitative methods to estimate hazard exposure are now well-defined, it is not the case regarding vulnerability assessment. Vulnerability is a complex concept involving a variety of disciplines from physical and socio-economic sciences (i.e. engineering, economics, social and health sciences etc.). Currently, two opposite trends exist: the 'physical' approach in which vulnerability is analysed as potential impacts (i.e. structural and functional) on the elements at risk (building, network, land cover); and the 'social' approach in which vulnerability is a combination of socio-economic variables determining people's ability to anticipate before a catastrophic event, to react during it, and to recover after it. For a complete analysis of vulnerability it is essential to combine these two approaches but in reality few works exist.

The objective of this research is to improve the Potential Damage Index (PDI), detailed in Puissant et al. (2013), originally developed to assess physical injury, structural and functional consequences of landslide hazard, by including socio-economic characteristics of population information. Data from the French Census data (INSEE, 2012) and a survey on risk perception (100 questionnaires obtained between 2014 and 2015/16) were used to propose an overall index taking into account the three main phases of risk management: preparedness, crisis management and recovery. This new index called Global Potential Damage Index (GPDI) is applied on the Upper Guil Catchment to assess potential torrential floods hazard in the context of the French funded project SAMCO (Society Adaptation for coping with Mountain risks in a global change Context).

Results of the PDI are compared with the GPDI and show significant differences. GPDI scores mapping are lower than PDI scores indicating that resilient population may qualify results obtained for physical consequences. In GPDI the social and institutional component is expressed by a unique value applied for the overall stakes of a same community. Consequently, socio-economics differences between Upper Guil catchments communities are highlighted and make results easily understandable for local manager.