



## **Fractal simulation of urbanization for the analysis of vulnerability to natural hazards**

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Since 50 years, mountain areas are affected by important land cover/use changes characterized by the decrease of pastoral activities, reforestation and urbanization with the development of tourism activities and infrastructures. These natural and anthropogenic transformations have an impact on the socio-economic activities but also on the exposure of the communities to natural hazards.

In the context of the ANR Project SAMCO which aims at enhancing the overall resilience of societies on the impacts of mountain risks, the objective of this research was to help to determine where to locate new residential developments for different scenarios of land cover/use (based on the Prelude European Project) for the years 2030 and 2050. The Planning Support System (PSS), called MUP-City, based on a fractal multi-scale modeling approach is used because it allows taking into account local accessibility to some urban and rural amenities (Tannier et al., 2012). For this research, an experiment is performed on a mountain area in the French Alps (Barcelonnette Basin) to generate three scenarios of urban development with MUP-City at the scale of 1:10:000. The results are assessed by comparing the localization of residential developments with urban areas predicted by land cover and land use scenarios generated by cellular automata modelling (LCM and Dyna-clue) (Puissant et al., 2015). Based on these scenarios, the evolution of vulnerability is estimated.