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A method to analyze territory resilience to natural hazards, the example of the French Riviera against tsunami

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Climate change and major crisis have been increasing during the 21st century, which have impacted people and helped them to realize that they had to protect themselves against it. That is why scientists, practitioners and institutions are more and more exploring resilience concept and methodology (Dauphiné, Provitolo, 2013). Resilience came at first from material physics, and is now developed in different disciplines, like psychology, ecology, economy, more recently geography, and more specifically natural risk analysis. The downside of this multidisciplinary interest is that this concept became a polysemous concept, resulting on the difficulty, for the scientific community, to agree about a single definition to characterize it (Reghezza et al. 2015).

Our presentation will propose a resilience analysis model of a territory subject to naturel hazard, after which, this methodology will be demonstrating to a specific territory, the French Riviera, more precisely the Alpes-Maritimes. We choose, as natural hazard to realize our study, the tsunami which could impact the Alpes-Maritimes coast. This choice has been done for many reasons:
- This natural hazard is almost not included in the different studies and french official documents, whereas the risk is real in Mediterranean. Two significant events had happened in our study area: the first one in 1887, following the Ligurian earthquake (Ioualalen et al. 2010); the second one in 1979, off Nice airport, produced by a submarine landslide (Migeon, 2011b). Those events present a crucial particularity, being near the source, the arrival time is quiet short, making any planed escape impossible. We can describe them as flash risks.
- The study area, containing coastal cities of the Alpes-Maritimes, presents many key issues, humans and economics.
- This region has a specific geography, including a territory which has been developed between sea and mountains, a high density in the coast, and an anisotropy of the networks (infrastructure, communication, etc.). Yet we know how essential it is to maintain network in the recovery after disasters. (Lhomme et al. 2010).

For this purpose, we relied on the resilience analyst method suggested by the scientific group Resilience Alliance (2010), who came from the human and social sciences. This methodology caught our interest, because it appeared to have a systemic approach, and allowed to include temporal dimension of an event (prevention and crisis management). However, this model presented some limits when we translated it in the field of risks and disasters. In order to create a model fully functional in this domain, we suggested to bring some changes.

This new methodology not only allowed to provide an evaluation grid to the territory and the population reactions to an event, but also to determine preventive strategies (ante-catastrophe) and after disaster recovery strategies (post-catastrophe) that could be used.