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Toward a space-time scale framework for the study of everyday life activity's adaptation to hazardous hydro-meteorological conditions: Learning from the June 15th, 2010 flash flood event in Draguignan (France)

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Western Mediterranean regions are favorable locations for heavy precipitating events. In recent years, many of them resulted in destructive flash floods with extended damage and loss of life: Nîmes 1988, Vaison-la-Romaine 1992, Aude 1999 and Gard 2002 and 2005.

Because of the suddenness in the rise of water levels and the limited forecasting predictability, flash floods often surprise people in the midst of their daily activity and force them to react in a very limited amount of time. In such fast evolving events impacts depend not just on such compositional variables as the magnitude of the flood event and the vulnerability of those affected, but also on such contextual factors as its location and timing (night, rush hours, working hours...). Those contextual factors can alter the scale and social distribution of impacts and vulnerability to them. In the case of flooding fatalities, for instance, the elderly are often said to be the most vulnerable, but when fatalities are mapped against basin size and response time, it has been shown that in fact it is young adults who are most likely to be killed in flash flooding of small catchments, whereas the elderly are the most frequent victim of large scale fluvial flooding.

Further investigations in the Gard region have shown that such tendency could be explained by a difference of attitude across ages with respect to mobility related to daily life routine and constraints. According to a survey of intentional behavior professionals appear to be less prone to adapting their daily activities and mobility to rapidly changing environmental conditions than non-professionals. Nevertheless, even if this appears as a tendency in both the analysis of limited data on death circumstances and intended behavior surveys, behavioral verification is very much needed.

Understanding how many and why people decide to travel in hazardous weather conditions and how they adapt (or not) their activities and schedule in response to environmental perturbations requires an integrated approach, sensitive to the spatial and temporal dynamics of geophysical hazards and responses to them. Such integrated approaches of the Coupled Human and Natural System have been more common in the environmental change arena than in risk studies. Nevertheless, examining interactions between routine activity-travel patterns and hydro-meteorological dynamics in the context of flash flood event resulted in developing a space-time scale approach that brought new insights to vulnerability and risk studies.

This scaling approach requires suitable data sets including information about the meteorological and local flooding dynamics, the perception of environmental cues, the changes in individuals' activity-travel patterns and the social interactions at the place and time where the actions were performed. Even if these types of data are commonly collected in various disciplinary research contexts, they are seldom collected all together and in the context of post-disaster studies.

This paper describes the methodological developments of our approach and applies our data collection method to the case of the June 15th, 2010 flash flood events in the Draguignan area (Var, France). This flash flood event offers a typical example to study the relation between the flood dynamics and the social response in the context of a sudden degradation of the environment.