



Learning from today's extreme weather events to increase our resilience to climate change

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According to the IPCC, flooding is the most widespread serious potential impact of climate change on human settlement. Vulnerability to floods can be thought as a function of exposure and adaptive capacity, and all three entities have been increasing in many areas. Therefore, in order to inform decision-makers, it is crucial to better understand what are the vulnerability factors but also to what extent individuals and societies are capable to adapt their way of life to their changing environment. In this perspective, flash flood events offer a good example of the kind of extremes that our societies may have to face more often in the future. Characterized by their suddenness, fast and violent movement, rarity and small scale, they are particularly difficult to forecast accurately and leave very little lead-time for warnings.

In this context, our interdisciplinary team conducts research focusing on individual and human organization responses to warning and crisis situations by using a comprehensive, coupled natural—human system approach over time and space scales. The objective is to understand i) what cognitive and situational factors help individuals and communities to shift from normal daily activities to adapted crisis response and ii) what is the dynamic of this process compared to the one of the natural phenomenon. In this regard, our research learned both from individual perception and behavioral intent survey (“what if” type of survey) than from actual behavioral data gathered in a context of post-event investigations.

The review of the literature shows that behavioral intent surveys do not accurately predict warning and crisis response as well as behavioral data do. Knowing that, the difficulty is to obtain consistent and accurate spatio-temporal behavioral data. According to our experience, this is particularly difficult in the context of crisis situations. Behavioral verification requires real-time observations and data collection of indicators reflecting individuals and community responses to the crisis. Most of the time this information is hard to gather as no methodology has been developed for it. Social impacts of extreme weather event are related by public media during and shortly after the event. The impacts are documented by public agencies such as rescue services, medical care facilities, insurance companies in the limit of their respective missions and of their means. It appears during exceptional crises, the reporting, routinely done by these institutions, is made very difficult because the pace of rescue operations is too great (for example, almost 3000 people were rescued in one night during the September 2002 event). Social consequences are also partially summarized in the framework of official investigations led by state institutions after the crisis (see, for instance the report of Huet et al. (2003) in French). All in all, the resulting information appears to be fragmented and too heterogeneous to be used for statistical analysis and for monitoring long-term evolution of social vulnerability and adaptive capacity.

The behavioral data collection is only possible in the framework of an organized partnership between scientists from different disciplines and operational services as national and European civil protection structures. An opportunity for settling this type of collaboration maybe find through existing structures as research observatories like the “Cévennes-Vivarais Mediterranean Hydrometeorological Observatory” (OHM-CV) located in Southern France and the “North-eastern Italy Hydrometeorological Observatory”, located in NE Italy. These natural

observatories stem from a research initiative aiming to understand intense Mediterranean storms that lead to devastating flash floods. A primary objective is to bring together the skills of meteorologists and hydrologists, model designers and experimentalists, researchers and practitioners to cope with these events that are so difficult to predict. Part of our research on behavioral response to flash flood was conducted in the Gard area in France as well as in the Friuli region in Italy. It was a first intent to associate social science research to hydro-meteorological observation. This interdisciplinary collaboration has been a real success and it needs now to be extended to operational services involved in crisis management and response. Based on examples of what have been done with behavioral and physical data collected in the context of interdisciplinary post-event investigations, the presentation will focus on the scientific needs in terms of methods, data collection and archive and make a proposal of integrating this dynamic in the framework of an emerging project called DELUGE (Disasters Evolving Lessons Using Global Experience). This trans-disciplinary initiative aims at developing capacity building related to post-disaster field techniques to change the post-event field experience enterprise and assure that practitioners, forecasters, researchers, students, and others learn from experience to reduce losses.