How do people behave during flash floods and why? Lessons for the prediction of the human vulnerability dynamics in short-fuse weather events

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Social scientists have a long history of documenting disasters and natural extreme events' behavioural response through the collection of perishable post-event data (Gruntfest 1977; Quarantelli and Dynes, 1977; Stalling, 1987; Quarantelli, 1997, 2003; Drabeck, 1999). Such empirical and theoretical foundations constitute a strong background to understand crisis responses and advance our knowledge of the drivers of human behavioural responses to fast evolving weather-related events. Outputs from this field of research show that public warning and behavioural response is a social process that takes several phases before a protective action is put in place (Mileti, 1995; Trainor et al., 2008, Parker et al., 2009, Lindell et al., 2004). These authors identified factors related to the characteristics of the hazard, the warning information characteristics, the situational and personal characteristics of the receiver and the socio-cultural context as strong determinants of the public behavioural response. In fast-moving events like flash-floods, the amount of time available to detect the threat and respond to it is so limited that protective actions often consist in dealing with contingent situations triggered by the irruption of dangerous circumstances in the middle of daily life activities and routines (Ruin et al., 2008, 2009; Terti et al., 2015). Understanding how people actually detect potentially dangerous circumstances and manage to timely adapt their routine to cope with the speed of the hazard evolution remains a challenge. Based on insights from post-event interviews, online surveys were used to quantitatively document behavioural responses associated with 3 catastrophic flash flood events that happened in southern France in 2014 and 2015. The coupled analysis of responses to these surveys with hydro-meteorological parameters allows to better understand the link between the event magnitude and self-protective behaviours in the context of short-fuse weather events as flash floods. Knowledge gained from such an integrated approach is necessary for drawing lessons for the development of coupled human-natural system modeling and the prediction of the human vulnerability dynamics in short-fuse weather events.