

REV#1

*The paper presents a valuable approach of citizen participation into disaster management. The paper properly recognises the contemporary dimension of participation, which is communication of the appropriate event and connected intervention.*

We thank the reviewer for this comment.

*However, the relationship between participation and communication is not properly explained with the sociological background.*

We accepted this interesting suggestion, and added a new chapter: 2. Background in risk communication and perception, for analysing the state of art about the public participation in the context of natural hazard risk communication.

The new text reads (lines 89-109):

“Extensive discussions have been occurred in the past about the most appropriate ways to manage the potential consequences of natural hazards (Scolobig et al. 2015), and governments began to institutionalize disaster risk management processes and practices (McEntire, 2006). More recently, an integrated approach to risk management processes is emerging, encompassing in a coordinated way activities needed to preserve a level of safety with regard the risk posed by natural hazards (<http://www.climchalp.org/>). Initially associated with environmental management, public health, and emergency management matter, risk communication aims at informing people about a potential hazard and the associated harms (Steelman and McCaffrey, 2012). In the last decade, the relevance of communication is increasing in response to the changes affecting risk governance (Höppner et al., 2010). Accordingly, communication must serve multiple purposes spanning all phases of risk management (Renn 2005) enabling more effective decisions, knowledge-based actions (Höppner et al., 2010), and addressing the exchange of knowledge and attitudes between all the involved actors (i.e., public bodies, private sectors, third sector, citizens). In this context, public participation is crucial, and defined as the co-decision in planning processes designed by others, where the central elements of the participation concept are influence, interaction, and information exchange (Bostenaru, 2004). Starting in the 1990s, extensive public consultation and participation in risk management have focused on re-establishing public trust (Rowe et al., 2004). The appropriate transfer of knowledge between experts and the broader public can be facilitated by effective communication strategies and programs, at national or local level, to align the views of the public with those of the experts (Frewer,

2004). More recently, the increased attention of public institutions to stimulate the participation of citizens in the definition and delivery of public services is leading to the adoption of a citizen-centred risk management approach which takes into account social concerns and the citizens' s perception about risks.”

*For a solid view on the sociology of disasters I would recommend the studies by Plapp (or Kunz-Plapp), some of them in NHESS. Some of them refer to flooding.*

We thank for the suggestion and we integrated the findings of the recommended studies in the new chapter of background.

*A proper communication is influencing the perception of risk, and this is also a link I miss in the paper. Also, some studies on risk perception from a psychology background are done by the team around Armas, from which those by Nenciu (Posner) on flood available in Natural Hazards recently. Also Krebich published in NHESS and elsewhere on perception of flood and how it leads to measures in Germany. Myself I presented the sociology background of participation and communication for earthquakes in NHESS.*

We accepted this suggestion, and we integrated the added chapter with a brief background in risk perception of natural hazards.

The new text reads (lines 110-134):

“Risk perception is also important to determine the attitude towards risks and, when information campaigns and risk communication strategies are designed, the public perception should be known (Plapp & Werner, 2006). Risk perception is a subjective assessment of the hazard occurrence’s probability and people’s feelings of the consequences (Posner & Armas 2014). A gap between the public’s perception of their own responsibility, and that of authorities in terms of risk reduction was found by Fernández-Bilbao and Twigger-Ross (2009) who, working in England and Germany, found that the public did not perceive that reducing flood risk was their responsibility. Plattner et al. (2006) highlighted a systematic discrepancy between the individual subjective risk evaluation (perceived), and formal risk evaluation procedures. Similarly, in Italy two national surveys conducted to measure the public perception of landslide and flood risk confirmed that in most of the Italian regions the observed perception of the threat did not match the long-term risk posed by landslides and floods to the population (Salvati et al., 2014).

If it is globally accepted that risk perception has strong implication for the success of risk communication. It is also expected that effective risk communication shapes risk perception (Höppner

et al., 2010). There are many studies trying to establish which formats of communication may be most effective (e.g., Faulkner and Ball 2007; Fernandez- Bilbao and Twigger-Ross 2009; Kashefi and Walker 2009; Bier 2001). Three phases of risk communication were identified by Leiss (1996) in the USA, including one-way communication, persuasive communication, and two-way communication. As Höppner et al. (2010) reported, the first is primarily used to convey probabilistic information, educate the public at risk, and to gain consent over risk management practices, whereas the second is thought to change people's risk related behaviours. In the latter phase, all actors should engage with, and learn from each other (Renn, 2005). Risk communication is a complex activity moving from the one-way distribution of information towards a two-way exchange of knowledge and more participatory approach (Höppner et al., 2010). Despite this latter communication approach seems to be more effective, in the review work conducted by Höppner et al. (2010) between all the communication practices posed by governmental authorities, national and local agencies, the majority resulted one-way efforts, focused solely on improving hazard knowledge or raising risk awareness, mostly regarding flood hazard.”

*From the scientific content I would be interested how the citizens interact, if they are just foreseen with information (first step of participation, see my article) or if they can provide information, ex. through mobile devices, as designed in several EU projects for continuing the information gathering after the project end. Recently ESRI started a MOOC of teaching creating story maps which do not require programming knowledge.*

The Polaris initiative does not have “teaching” among its goals; and as such, it does not consider any e-learning (e-teaching) activity. Devoted to increase awareness on risk perception, we reckon that the provision of information (i.e. images, comments) from citizens through Polaris should be stimulated by improving the integration of the website content with social media such as Instagram and Pinterest where people prefer to exchange images and content instead of using websites.

*It seems to me that only the blog section is bottom up. However, what differentiates communication and participation is how citizens can engage more than perceiving.*

We agreed with the reviser comment and to better explain the role the blog section and the relation between Polaris and the public we added a new paragraph for discussion.

The text now reads (lines 353-381):

“In Polaris we mean risk communication as a two-way exchange of related information and knowledge on natural hazards and associated risk for the population. The Blog section of the website

is mainly encouraging bottom-up feedback through visitors' s comments. The link to Facebook stimulates more feedback from citizens who upload pictures and make post on Facebook. This means that participation, whose central elements are influence, interaction and information exchange (Bostenaru, 2004), is mainly facilitated by the link with Facebook. However, the website Blog section remains less active than we expected, for at least two reasons: first, in Italy, the perception of geo-hydrological hazards is still very weak, people show less interested toward these geo-hydrological events than to other natural hazards such as, seismic risk (Salvati et al., 2014). Second, people do not know how a geo-hydrological event can hit them. People are interested to actively participate through the blog section mainly when a particularly disastrous event is occurring, and in such a case, by simply uploading videos and pictures rather than asking for explanation or advices. This means that, despite many institutions are making efforts to increase the public understanding of geo-hydrological risk through nationwide awareness campaigns (e.g. I do not risk, <http://iononrischio.protezionecivile.it/>), people still ignore how a large part of the Italian territory suffers of geo-hydrological risk. Such an underestimation of the possible risks, the high confidence in the local administrators towards which citizens delegate their personal safeness are all factors that impede an effective risk communication.

It is important to highlights that Polaris offers a knowledge-oriented risk communication which tends to operate continuously and does not regard the warning messages released in the event of a disaster. The communication efforts seeks to change the people's attitudes to the geo-hydrological hazard that they may have encountered giving many examples of what had happened before. People will not react to risk warnings if foregoing communication has not motivated and prepared them.

For this purpose, we are going to evolve the Blog section of Polaris which is the most relevant for stimulating public participation at any moment. In particular, we plan to integrate other relevant social media, such as Instagram and Pinterest, stimulating the sharing of images and videos and the associated tags and comments. For encourage more resilient behaviours during the occurrences of hazardous events, we would stimulate the usage of video through the YouTube and Vimeo channels that we can comment for feedback and/or advices. Finally, we are going to create new synergies with the "I do not risk" campaign and website of the Italian Department of Civil Protection, which will increase traffic, information exchange and, as such, strengthen the risk perception by the Italian population."

*Can they contact the civil protection to organise to bring sand bags for example? In Bernburg in 2013 I assisted to successful prevention of flood damage despite flood due to citizen engagement. (I attach the photo of protection, which was effective, in Halle on the same river Saale the dam broke)*

*Over the information of citizen, citizens must become active to do constructive participation, not only protest in case what unlike events and perception. Is this development foreseen in the future for the product if not already existing?*

We agree with the reviewer opinion but this is not in the scope of Polaris. The website project is an initiative developed by a research institution and not by the public institutions in charge of risk management (e.g. national and/or local civil protection authorities).

*I hope this helps to improve the paper.*

We thank the reviewer for the helpful in improving the paper.