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Crossing borders between social and physical sciences in post-event investigations

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In natural hazard research social and physical scientists tend to approach post-event investigations within their narrow disciplinary lenses. Efforts that are called trans-disciplinary often add social science but do not integrate it effectively. For example, an economist might be brought in to address a question of "value" without any understanding or interest in the context in which the value will be applied (e.g., Merrell et al. 2002, Simmons and Sutter 2005). At the same time, social scientists would benefit from some knowledge of geology, meteorology, hydrology, forecasting operations, and hazard detection systems in order, for instance, to understand the nature and types of uncertainty in the physical systems.
Proactive partnership between social and physical scientists in post-event investigations needs a background knowledge and a preparation about several issues from both sides. Moreover neither physical nor social scientists necessarily understand and appreciate the contributions that they can reciprocally bring to their works.

Post-event collaborations between social and physical science are rare. The few examples of multi-disciplinary work, when examined closely, are not integrated collaborative projects but patchwork quilts of a variety of specialists taking separate aspects of an issue. There are examples where social scientists and engineers are engaged in one project, but the efforts tend to include social scientists as an "add on" to an existing physical science investigation. In this way, true integration of information, data and knowledge from different fields is lacking and the result is that neither the physical nor the social science perspectives gain a comprehensive picture of the issue under scrutiny.

Looking at the flash flood problem, the atmospheric and hydrological generating mechanisms of the phenomenon are poorly understood, leading to highly uncertain forecasts of and warnings for these events. On the other hand warning and crisis response to such violent and fast events is not a straightforward process. In both the social and physical aspect of the problem, space and time scales involved either in hydro-meteorology, human behavior and social organizations sciences are of crucial importance. Interdisciplinary collaboration is particularly important here because those involved with such events, including scholars, hydrologists, meteorologists, road users, emergency managers and civil security services, all have different time and space frameworks that they use for decision-making, forecasting, warnings and research.

This presentation will show examples of original findings that emerged from a successful collaboration among different scientific disciplines. Working with geophysical scientists drives us to analyze social data from a different angle, integrating time and space scales as they are used to do in hydrometeorological research. This comprehensive, coupled natural—human system approach over time and space is rarely used but it has been shown to be especially pertinent to integrate social and physical components of the flash flood risk. (Ruin et al., 2008, Ruin et al., 2009, Creutin et al., 2009). Based on these examples we propose to develop a new network, DELUGE (Disasters Evolving Lessons Using Global Experience), to address trans-disciplinary efforts and 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.

DELUGE is an interdisciplinary, international network aimed at developing a sustainable community of meteorologists, hydrologists, geographers, anthropologists, engineers, planners, economists, and sociologists working together to create a set of guidelines for post-disaster investigations to reduce losses from short-fuse flood events, particularly flash floods, debris flows and landslides (hereafter termed flash floods). Flash-floods, debris flows, and landslides often develop at space and time scales that conventional observation systems are not able to monitor for rainfall and river discharge.