

## **What can we learn from the deadly flash floods? Post Event Review Capability (PERC) analysis of the Bavaria and Baden-Wurttemberg flood events in Summer 2016**

Michael Szoenyi

Zurich Insurance Company - Flood Resilience Program. Zurich, Switzerland (michael.szoenyi@zurich.com)

In May/June 2016, stationary low pressure systems brought intense rainfall with record-breaking intensities of well above 100 mm rain in few hours locally in the southern states of Baden-Wurttemberg and Bavaria, Germany. In steep terrains, small channels and creeks became devastating torrents impacting, among others, the villages of Simbach/Inn, Schwäbisch-Gmünd and Braunsbach. Just few days prior, France had also seen devastating rainfall and flooding. Damage in Germany alone is estimated at 2.8 M USD, of which less than 50% are insured. The loss of life was significant, with 18 fatalities reported across the events.

This new forensic event analysis as part of Zurich's Post Event Review Capability (PERC) investigates the flash flood events following these record rainfalls in Southern Germany and tries to answer the following questions holistically, across the five capitals (5C) and the full disaster risk management (DRM) cycle, which are key to understanding how to become more resilient to such flood events:

- Why have these intense rainfall events led to such devastating consequences? The EU Floods directive and its implementation in the various member states, as well as the 2002 and 2013 Germany floods, have focused on larger rivers and the main asset concentration. The pathway and mechanism of the 2016 floods are very different and need to be better understood. Flash floods and surface flooding may need to become the new focus and be much better communicated to people at risk, as the awareness for such perils has been identified as low.
- How can the prevalence for such flash floods be better identified and mapped? Research indicated that affected people and decision makers alike attribute the occurrence of such flash floods as arbitrary, but we argue that hotspots can and must be identified based on an overlay of rainfall intensity maps, topography leading to flash flood processes, and vulnerable assets. In Germany, there are currently no comprehensive hazard maps for flash and/or surface flooding.
- What recommendations can be made from the investigation of the consequences? We highlight how additional processes that cause significant damage, such as log jams, backwater increase, temporary dam formation, etc., are currently insufficiently understood and incorporated into decision-making.
- What are the social and human long-term effects of such flash flood events, and how can the insights from this review be incorporated into future decision-making to better protect people and assets as part of integrated flood risk management?