



## **Results of the post-event survey conducted after the extreme flash flood occurred in the Var region (South of France) in June 2010**

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The opportunities to study and understand flash floods still remain highly limited by the lack of observations. If not destroyed or damaged during the flood events, the existing river gauging station networks are too sparse to capture in detail the spatio-temporal pattern of these floods, generally affecting small rivers. Moreover, the short duration of flash floods (few hours) limits the possibility for conducting real time field observations. In this context, extensive post-event surveys can be of great interest to collect information that can be useful to better understand the phenomena, and to define mitigation measures that may reduce damages in the future: spatio-temporal pattern of the flood, flows based on discharge estimations and interviews of witnesses, delineation of the flooded areas based on high-water marks, detail and causes of damages, circumstances of deaths...

The present communication presents the outcomes of the post-event survey conducted after the extreme flash floods that occurred on the 15th and 16th of June 2010 around the town of Draguignan, in the South of France. The floods were induced by an extraordinary rainfall event: rainfall accumulations exceeding 400mm within 24-hours were recorded. It is by far the record daily accumulation for the region according to the data of the existing raingauge network, its estimated return period exceeding largely 100-years. The induced flash floods caused important damages to several towns and 25 casualties.

Technical services of the French State and local authorities as well as research institutions involved in the HYMEX project collaborated to the extensive field survey conducted after the floods. The collected data set includes discharge estimates at the gauged stations by water level reconstitution and rating curve extrapolation (half of the hydrological network crashed down during the event), more than 35 peak discharge estimates at various ungauged locations of the stream network, with often an idea of the time of the peak obtained through witnesses' interviews, and more than 1200 geo-referenced high water marks.

This data set provides interesting information about the spatial variability of the hydrological response of the watersheds and about the dynamics of propagation of the flood. Based on this data set, it was possible to reconstitute the flood genesis and also to estimate the possible return periods of the estimated peak discharge values along the river network. The circumstances of the casualties were also analysed, in order to understand how they could have been avoided. Some recommendations – already partly put into action - were formulated to reduce in the future the impact of such an event, such as the strengthening of the gauging network, the development of a flood warning system based on the experience gained through the post event survey, or the application of more constraining building regulations in the exposed areas.

The affected area (South Eastern part of France where no extraordinary flash flood had been so deeply documented in the past) and the collaboration between technical services and a large number of research institutions during a post-event survey make of this survey a particularly interesting case study.