

Integrated flash flood analysis in ungauged watersheds.

M.G. Grillakis and I.K. Tsanis

Department of Environmental Engineering, Technical University of Crete, Chania, Greece. (manolis@hydromech.gr; tsanis@hydromech.gr)

Reconstruction of flash flood events processes in ungauged basins requires a synthesis of alternative information sources to compensate for the absence data. The present study presents the combination of information from very high resolution Digital Elevation Models (VHR-DEM), intensive post event surveys and rainfall-runoff modeling in order to reconstruct the flash flood processes for the event of October 17, 2006 in Almirida basin. The VHR-DEM produced by a GeoEye-1 0.5 m resolution satellite stereo-pair is assessed for flood plain management applications such as watershed delineation and river cross-section extraction. The procedure is applied at the 25km² watershed of Almirida. Cross sections and watershed boundary extracted based on the generated high resolution DEM used for rainfall-runoff and hydraulic modelling. The synoptic meteorological analysis shows the dynamic evolution and the path of the storm that led to the flash flood event, while METEOSAT imagery reveals critical information about the structure and timing of the storm. Precipitation time series is generated from neighbouring rain-gauges and C-Band weather radar data. A post flood event field study produced evidence for peak flood stage and allowed for key cross section measurements, while interviews with eye witnesses revealed the exact timing of the peak stage. Semi-distributed and lumped hydrological/hydraulic models are applied to simulate the runoff and are calibrated on the witnessed peak stage values. Results shows, that the combination of information from post event surveys, VHR-DEMs and rainfall-runoff modeling can decrease the uncertainty in peak discharge estimation and event interpretation.