



11-14 November 2012 Umbria Region (Central Italy) flood event: from prediction to management for civil protection purposes

Nicola Berni (1), Claudia Pandolfo (1), Marco Stelluti (1), Renato Zauri (1), Francesco Ponziani (1), Marco Francioni (1), Federico Governatori Leonardi (1), Alessandro Formica (1), Loredana Natazzi (2), and Sandro Costantini (1)

(1) Umbria Region, Civil Protection Service, Via Romana Vecchia, 06034 Foligno (PG), Italy, (2) Umbria Region, Water Resources and Hydraulic Risk Service, P.zza Partigiani 1, 06100 Perugia (PG), Italy

Following laws and regulations concerning extreme natural events management, the Italian national hydrometeorological early warning system is composed by 21 regional offices (Functional Centres - CF). Umbria Region CF is located in Central Italy and provides early warning, monitoring and decision support systems (DSS) when significant flood/landslide events occur. The alert system is based on hydrometric and rainfall thresholds with detailed procedures for the management of critical events in which different roles of authorities and institutions involved are defined. For the real time flood forecasting system, at the CF several operational hydrological and hydraulic models were developed and implemented for a "dynamic" hazard/risk scenario assessment for Civil Protection DSS, useful also for the development of Flood Risk Management Plans according to the European "Floods Directive" 2007/60.

In the period 11th-14th November 2012, a significant flood event occurred in Umbria (as well as Tuscany and northern Lazio). The territory was interested by intense and persistent rainfall; the hydro-meteorological monitoring network recorded locally rainfall depth over 300 mm in 72 hours and, generally, values greater than the seasonal averages all over the region. In the most affected area the recorded rainfall depths correspond to centenarian return period: one-third of the annual mean precipitation occurred in 2-3 days.

Almost all rivers in Umbria have been involved, exceeding hydrometric thresholds, and several ones overflowed. Furthermore, in some cases, so high water levels have never been recorded by the hydrometric network. As in the major flood events occurred in the last years, dams (Montedoglio and Corbara dams along Tiber River and Casanuova dam along Chiascio River) and other hydraulic works for flood defense (e.g. along Chiani stream) played a very important mitigation role, storing high water volumes and avoiding the overlap of peak discharges downstream.

During the event many emergency interventions were necessary. There were no casualties among the population, but many landslides and flooding occurred causing over 240 million Euros of damages (to hydraulic works, infrastructures, public and commercial facilities, residential buildings, agriculture, etc.) enough to induce the Regional Administration to request declaration of state of emergency to the National Government.

The day before the beginning of the event (10th November) QPFs values were high enough to activate "Attention" Phase of Regional Civil Protection System and CF, during the critical phases, provided 24h decision support activities, also through the official web site (www.cfumbria.it), very useful for monitoring and data/info dissemination from the national to the municipality level. The thresholds presented good agreement with direct territorial presidiums observations and the alert system has been tested.

The purpose of this work is to highlight what worked well and what did not, in order to improve the early warning and DSS for Civil Protection purposes.