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An operational food warning system in Andalucía (Spain): Presentation and first successfully results

Pierre-Antoine Versini (1), Carles Corral (1), Daniel Sempere-Torres (1), and Antonio Santiago-Gahette (2)
(1) CRAHI-UPC, Barcelona, Spain, (2) EGMASA, Sevilla, Spain

The Guadalhorce basin (3200 km2, 130000 inhabitants) is located in Andalucía (South of Spain). Historically the river represents an important risk for the city of Malaga and periodically causes floods along its course. In 2008 the regional government implemented an operational flood warning system with the aim of minimising risk to people, economic activity, and guiding water resources management. The system is oriented to provide distributed warnings based on surface rainfall accumulations and runoff forecasts (at 1 km resolution). These risk warnings are related to hazard probability expressed in terms of return periods.

Rainfall accumulation maps are generated according to the following two alternatives: (1) interpolation of the measurements of a network of 40 rain gauges covering the basin, and (2) measurements of the Mijas C-band radar located at 1173 m and covering the whole basin. Radar data are processed according to a complete chain of algorithms including ground clutter elimination, rainfall type classification (convective/stratiform) and correction with a vertical profile of reflectivity.

Runoff forecasts are computed with a grid-based rainfall-runoff model incorporating the SCS equations at cell scale. The routing is done with a linear diffusive wave unit hydrograph, separating the hillslope and river-channelled process. Because of the miss of the lack of hydrological records, this model was calibrated a priori on a large part of the basin area.

After presenting in details the operational system, it will be illustrated through a concrete example. It has successfully performed during a recent storm (7 January 2010). During this event -the most important since the system works- over 50 mm of rainfall dropped in few hours around Malaga, which resulted in flooding of parts of the city and road submersions. First results show how the warning system performed well and was able to forecast the location and timing of flooded areas.