



## **The use of processed radar data for hydrological purposes in the Besòs catchment**

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Several efforts to apply radar data to hydrological modelling have come up against the problem of quality in radar estimates. Radar measurements are affected by many error sources, and they intrinsically differ from what it is needed in hydrology (rainfall at ground). Then, it is difficult to assure an optimal hydrological application, even when a coherent merging with raingauge measurements is taken into account.

Research made at GRAHI-UPC is focused on the development of algorithms that process raw radar data images in order to improve as much as possible the derived rainfall field (Corral et al. 2001). Some of these developments have been tested from the point of view of hydrograph representations within the concept of hydrological validation, using a rainfall-runoff model in a simulation framework (Berenguer et al. 2004, Sánchez-Diezma et al. 2001). Here, a reference rainfall field (from measurements or just derived in optimal conditions) provides the reference hydrograph to compare with the other simulations.

On the other hand, in order to analyse the hydrological potential of radar estimates, a crude classical application using real event data is needed. In this study we have enough data for some medium flood events occurred from the end of 1999 to 2004, where raw radar data were available to derive processed rainfall fields (raw data provided by the Spanish Meteorological Institute radar located near Barcelona). The corrected radar data involve many of the already developed and validated processing algorithms (ground clutter substitution, mean signal attenuation, separation into convective and stratiform rainfall, continuity by means of tracking between consecutive pictures). However, algorithms for correction of other important sources of error, such as attenuation or VPR extrapolation, are still under development.

The DiCHiTop grid-based rainfall-runoff model (Corral 2004) is applied to the Besòs catchment (1000 km<sup>2</sup>), comparing the performances obtained using only raingauge information against those from the radar field. The model is calibrated using combined information of six level gauges over a set of events using both rainfall fields, methodology that allows us to evaluate the total improvement obtained due to the rainfall field. A cross validation analysis is also carried out in order to assess the sensibility of hydrographs to rainfall structure.

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