



Hydrological performance of rainfall fields estimated automatically by Kriging from rain gauges and radar data

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Rain gauges and weather radar provide rainfall information with different characteristics. Different authors have studied various merging techniques to combine data of these both sources, e.g. geostatistical approaches, seeking improve the quality of flow estimations, but none have become a reference method. During last years we have developed a methodology to blend raingauges and radar data in real time using a fully automatic definition of spatial correlation models and kriging estimators (Velasco et al., 2004; Velasco-Forero et al., 2003). Previous geostatistical approaches have reported difficulties to fit, in real-time, theoretical models of variograms to the experimental spatial variability without making strong assumptions (e.g. isotropy, temporal invariance). With our technique, two-dimensional correlation maps can be automatically defined for each time step from either rain gauges or radar data. Analyses of accuracy, temporal stability, and spatial tendencies of estimated rainfall fields and effects on the estimations quality of data source, of kriging methodology, and of accumulation interval of data used were reported previously (Velasco-Forero et al., 2005a; Velasco-Forero et al., 2004; Velasco-Forero et al., 2005b).

In this study we are interested into analyse the potential of this merging technique on the hydrological flow estimation. Therefore, DiCHiTop grid-based rainfall-runoff model (Corral, 2004) is applied to the Besòs catchment (1000 km² basin located near Barcelona, Spain). The model is calibrated independently for each type of rainfall

fields using the data of six level gauges over the same set of events. Observed discharges are compared with estimations obtained using only rain gauge information, with those got from the radar fields and with those computed from the merged rainfall fields. This allows us to identify and evaluate improvements associated with the use of radar rainfall fields or merged gauges – radar rainfall fields and thus, to assess the sensibility of hydrographs to rainfall spatial structure.

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