Flood hazard management using a distributed hydrological model forced with radar rainfall estimates based on a Kalman filter implementation

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North-western Italy, characterized by complex orography, is surveyed, with the primary objective of providing accurate rainfall monitoring, by about 350 real-time rain gauges – about 1 station every 100 km2 – and two multiparametric C-band weather radar, located close to Torino and in Ligurian Appennines. Both radar systems have Doppler and polarization capabilities, allowing measurement of four parameters: ZH, ZDR, V, σV. Rainfall estimation from radar are affected by several sources of error, due to instrumental and environmental conditions: for those reasons rain estimates are corrected with ground observations using a kalman filtering data assimilation. For hydrological hazard management derived rainfall fields are finally used as input for FEST, a distributed, physically based hydrological model. The model is used either for assessing the rainfall-runoff transformation and for flood wave routing along the hydrographical network.

The aim of this work is the evaluation of overall forecast chain performance in discharge evaluation, analysing the 1st September 2002 flood event.