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Estimation of areal precipitation based on rainfall data and X-band radar images in the Venero-Claro Basin (Ávila, Spain)

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The aim of this work is to estimate the spatial-temporal rainfall during precipitation events with hydrological response in Venero-Claro Basin (Avila, Spain). In this small mountainous basin of 15km2, flood events of different magnitudes have been often registered. Therefore, rainfall estimation is essential to calibrate and validate hydrological models, and hence implies an improvement in the objectivity of risk studies and its predictive and preventive capacity.

The geostatistical merging method of ordinary kriging of the errors (OKRE) has been applied. This technique has been already used by several authors to merge C-band radar and dense rain gauge networks. Here it is adapted to estimate hourly rainfall accumulations over the area with observations from one of the 5 existing X-band radar in Spain and 7 rain gauges located in the zone.

Verification of the results has been performed through cross-validation comparing the estimation error of the OKRE with the one obtained adjusting the Marshall-Palmer relation. Analyzed errors are bias, the Hanseen-Kuiper coefficient and the relative mean root transformed error. Results have an average error of 15%, distinguishing quite well between dry and wet periods.