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The existing methods for radar-rain gauge blending use direct rain gauge observations and detailed spatiotemporal radar measurements to produce Quantitative Precipitation Estimates (QPE). In the last years, many of these methods use kriging techniques to improve these estimates, thanks to the explicit incorporation of rainfall spatial variability characterized by the variogram function.

Velasco-Forero et al. (2009) proposed the use of kriging with external drift (KED) and non-parametric variograms. The technique uses the radar rainfall map as the drift to interpolate rain gauge observations; it also accounts for the anisotropy of the rainfall, since the variograms are two-dimensional; and, most importantly, the variograms are obtained automatically and updated every time new (radar and gauges) rainfall observations are available. As such, the technique proposed produces snapshot estimates that are independent in time.

The work presented here explores the extension of that technique to include the time dimension in the blending process, so that rainfall estimates depend, not only on current observations, but also on past observations. This extension accounts for the correlation in time, and implicitly imposes some coherence between consecutive QPE maps.

The technique has been evaluated for several rainfall events in the area of Barcelona (NE Spain), and compared with the results obtained with the original formulation of the technique, which does not account for correlation in time.