



A new method for combining radar and raingauge data: Modified Conditional Merging

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The estimation of rainfall fields, especially its spatial distribution and position is a crucial task both for rainfall nowcasting and for modeling catchment response to rainfall. Some studies of literature about multisensor have suggested that discharge estimations are improved when radar and rain gauge data are combined to estimate input rainfall fields. Sinclair and Peagam (2004) have proposed the Conditional Merging (CM) technique, a merging algorithm which extract the information content from the observed data and use it within an interpolation method to obtain the rainfall maps. The idea is to combine the “real”, but punctual amount of rainfall measured by raingauges with the structure of covariance and correlation of rainfall maps estimated from remote sensors (radar network or satellite constellation).

In this work is studied an enhanced algorithm based on CM, called Modified Conditional Merging.. The main innovation respect to classical CM is the estimation of the structure of covariance and the length of spatial correlation λ , for every raingauge, directly from the cumulated radar rainfall fields.

The domain of application is the Italy, where are both available a dense network of raingauge measurements (about 2500 stations) and a QPE estimated by the Italian Radar composite.

The MCM algorithm can be used in real-time over the whole domain to produce hourly the optimal rainfall maps. An application to several test cases together with the evaluation of algorithm performances are presented and discussed.