Geophysical Research Abstracts
Vol. 17, EGU2015-3013, 2015
EGU General Assembly 2015

Modified Conditional Merging technique: a new method to estimate a rainfall field combining remote sensed data and raingauge observations

Flavio Pignone (1,2), Nicola Rebora (1), and Francesco Silvestro (1)
(1) CIMA Research Foundation, Savona, Italy (flavio.pignone@cimafoundation.org), (2) University of Genoa, Genoa, Italy

The estimation of the rainfall field, 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 datafusion prove that combining data from different sensors (especially raingauges and radar) represents the best way to obtain an enhanced ad more reliable estimation of QPE and of the associated river discharge. Sinclair and Peagram (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 raingauges provide a punctual measure of the observed "real" rainfall while the remote sensors (radar network or satellite constellation) supply rainfall estimation maps which give an idea of the spatial correlation structure of the observed field.
In this work is studied an enhanced algorithm based on CM, called Modified Conditional Merging, which can be used in real-time to produce the optimal rainfall maps. The area of interest, where the CM has been applied, is Italy, where are both available a dense network of raingauge measurements (about 3000 stations) and a QPE estimated by the Italian Radar composite. The main innovation respect to classical CM is to estimate the structure of covariance and the length of spatial correlation λ, for every raingauge, directly from the cumulated radar rainfall fields. The advantages of this method is to estimate the local characteristic of the domain to obtain information at smaller scale, very useful for convective events. A cross-validation of the new method was done and several statistical scores were applied on the results. The validation on a large number of Italian past event along with its operational use are presented and discussed.