



Evaluation and comparison of satellite precipitation estimates with reference to a local area

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Precipitation is one major variable for many applications. Satellite retrieval systems, raingauge network and radar systems are complement to each other in terms of their coverage and capability of monitoring precipitation. Satellite rainfall estimates systems produce data with global coverage that can provide information in areas for which data from other sources are unavailable. Without referring to ground measurement, satellite-based estimates can be bias. Although some gauged adjusted satellite precipitation products are developed, an effective way of integrating multi-sources of precipitation information is still a challenge.

In this study we select a specific area in Sicily (Italy) having high density rain gauges to evaluate of satellite precipitation products. Sicily has an area of 26,000 sq.km and the gauge density of the network considered in this study is about 250 sq.km/gauge. It is an island in the Mediterranean sea with a particular climatology and morphology, which is considered as an interesting test site for satellite precipitation products on the European mid-latitude area. Three products (CMORPH, PERSIANN, TRMM_3B42) have been selected for the evaluation. Evaluation and comparisons between selected products is performed with reference to the data provided by the gauge network of Sicily and using statistical and visualization tools.

Considerations about differences between the point estimation given by gauges and the gridded surface provided by satellites are discussed as well as the difference between an evaluation based on point estimation and an evaluation based on interpolated data. An analysis of typical interpolation methods used for hydrometeorological purposes have been done to choose the most appropriate method considering size of grid satellite data and the density of gauge network. Finally natural neighbor interpolation procedure was adopted to obtain gridded surface data with the same resolution of satellite products. Hypothetical relationship between elevation and results is investigated as well as presence of particular patterns and goodness of extremes detection.

Results show that bias is considerable for all satellite products and extremes are rarely well captured. Analysis is described referring to the developing of a local system to get precipitation information for scientific and modeling purpose. It is evaluated the opportunity to elaborate a corrected product applying a bias correction procedure that would improve the quality of final data.