A quality-based approach for radar rain field reconstruction and the H-SAF precipitation products validation

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The satellite rainfall product validation program established within the EUMETSAT Satellite Application Facility on Support to Operational Hydrology and Water Management (H-SAF) makes use of the radar and rain gauge observations available among the partner countries to perform a continuous validation of the H-SAF precipitation products.

H-SAF precipitation products cover all the European area, and include microwave-only instantaneous rainfall estimation (H01 and H02),combined infrared-microwave instantaneous rain estimation (H03 and H04), and cumulated rainfall estimation (H05). Currently, the partner countries are doing big efforts to homogenize their operational procedure in order to reduce the intrinsic uncertainties related to the radar rainfall estimation and the network heterogeneity. This activity encourages the design and implementation of a common approach for the radar data quality evaluation to be used as constraint within the validation process.

A radar-based data quality scheme was recently proposed to deal with the main error sources, i.e., clutter, partial beam blocking, attenuation, vertical variability of precipitation.

The validation of the H03 (blended IR-MW instantaneous rainfall estimation) product, using radar-based rainfall estimations as ground reference, has shown relevant sensitivity to the estimated radar data quality, encouraging further investigation.

In this work, a general description of the satellite rain estimation validation strategies is presented, and the recently updated version of the radar data processing and quality retrieval scheme, taking also benefit by the dual-polarization radar capabilities, is evaluated using the observations of the rain gauge network as benchmark.