

Development and Evaluation of the Ground Radar and Infrared Satellite Combined Algorithm for the Italian Peninsula

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The Italian radar network is currently composed by 20 C-band and 2 X-band systems, managed by 11 administrations, able to cover most of the country. The product generation at national level is carried out by the Department of Civil Protection (DPC) that currently manages 7 C-band and 2 X-band systems, all with dual-polarization capability. The national mosaic provides an estimation of the precipitation intensity with a five minutes time resolution over a equi-spaced 1 km grid. A Quality Index (QI) map is associated to the rainfall rate map, taking into account the radar artifacts, the partial beam blockage, the height of measurements with respect to the freezing layer, the beam broadening and the rain path attenuation.

The geostationary Meteosat Second Generation (MSG) Spinning Enhanced Visible and Infrared Imager (SEVIRI) provides high-quality measurements across twelve visible (VIS) and infrared spectral (IR) bands. Several techniques have been developed exploiting VIS or IR observations (individually or in a combined way) to relate the cloud features to the surface precipitation. One of them is the blending Rapid Update (RU) technique combining IR observations with precipitation estimates obtained from spaceborne passive microwave radiometers, and used operationally within the EUMETSAT H SAF program.

Within the collaborative agreement between DPC and the Institute of Atmospheric Sciences and Climate (ISAC) of the National Research Council (CNR) a new blended algorithm has been developed that combines the ground radar precipitation estimates and the IR observations from SEVIRI to provide a precipitation map over the whole Italian territory every 15 minutes, at 1 km spatial resolution. The goal is to integrate the low QI ground radar measurements with the precipitation estimates inferred from IR observations. The IR precipitation estimates are based on regression curves built from a training dataset based on coincident IR and high QI radar observations.

The present work shows the preliminary results of the blended algorithm. The validation is carried out through a comparative study with the Italian rain gauges network.