

The Italian radar QPE: description, performance analysis and perspectives

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The Italian weather radar network, currently composed by 21 systems, is managed by a federation of national and regional bodies including the Department of Civil Protection (DPC), the Air Force, the regional weather services and the National Aviation Authority. In total 14 radars out of 21 are dual-polarized.

The DPC, currently managing 6 C-band and 2 X-band polarimetric systems, collects and processes the data provided by every network partner to generate and distribute national-level products. The rainfall products are mainly used for monitoring purposes within the national early-warning system. Consequently, specific activities are carried out to assess the related quality.

The applied processing chain attempts to deal with the main error sources by associating them a quality indicator, i.e. contamination by non-weather returns, attenuation, vertical variability of precipitation, beam broadening and DSD-variability affecting the inversion technique.

This work describes the current status of the network, in terms of algorithms, data quality control and operational performance.

Specifically, it is shown, on one side, that the use of polarimetric approaches have remarkably improved the overall rainfall retrieval performance, on the other side, that orography and the heterogeneity of the radar systems are the main factors affecting the estimate uncertainty. A seasonal dependency of the performance is also outlined.

Finally, future plans to improve the radar data quality are shortly discussed.