

QPF operational verification over catchmente area

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The estimation of QPF on river basins for purposes related to the issue of Civil Protection alerts for hydrogeological or hydraulic criticality is one of the main activities carried out operationally at the Hydro-Meteo-Climate Structure of Arpae-Emilia Romagna. To this end, a number of tools have been developed that, starting from the data provided by various numerical forecast models, such as IFS-ECMWF, COSMO-5M or COSMO-2I, allow to calculate the average value, the maximum or other percentiles of the precipitation field on the warning areas used by the National Civil Protection Department.

At the same time, a spatial verification methodology has been developed to compares the parameters of the expected precipitation distribution on the various alert areas with those calculated from the observed precipitation using the data of a high-resolution network of rain gauges. In fact, the main advantage of this verification technique is that it is not necessary to report forecasts and observations on a common grid. Information on precipitation averages or maxima, as well as the variability of the precipitation field within the area of interest, can be derived directly from the rainfall values for observation, while for models all grid points that fall within the area are used regardless of the resolution of the model. This simple spatial aggregation permits to apply the verification also to areas of any shape, like those which are used in warning forecast (catchments, alert areas, ...).

Verification of average values of precipitation over areas of interest can be used to investigate the ability of models in reproducing different amounts of precipitation. The use of the maximum of precipitation can instead provide some information on high precipitation even if not in the correct location but in the neighborhood, represented by the area of interest, e.g. the catchment area. The combination of a condition on the median and one on the maximum of precipitation can separate high localized precipitation from extensive precipitation. In this work it will be presented the verification methodology and some results obtained operationally on a seasonal basis. It will also be shown how the results of the verification can provide useful information on how to use the various forecasting systems and to decide in which situations one system is better than another.