13.41 COMPARISON BETWEEN DIFFERENT QPE BASED ON: MICROWAVE LINKS, RADAR ADJUSTED AND GAUGES

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Currently the most used tools to estimate quantitative precipitation are rain gauges and weather radars, both with relative merits and defects. Raingauges measurements are not reliable in case of intense precipitation event and have poor spatial representativeness due to high spatial and temporal variability of rainfall field. Weather radars monitor rainfall over large areas with high spatial resolution, but through indirect measurements and affected by various sources of error. A complementary approach is represented by a technology, that has not yet been tested in Italy, that consists in the extrapolation of rainfall intensity data from cellular communication infrastructures (i.e. in the identification of rain-induced attenuation of microwave links), usually called Microwave link (MWL) networks or Commercial Microwave links (CML).

A validation activity of these different QPE Quantitative Precipitation Estimates technologies was done over the Bologna province area (Italy) on the period February 20^{th} - June 30^{th} 2016 in the framework of the RainBO project LIFE15/CCA /IT/000035.

Validation exercise was carried out comparing microwave links QPE and radar adjusted QPE using as reference field a Raingauges spatial analysis (ERG5, a modified Shepard interpolation). Qualitative analysis, mainly based on daily accumulation maps, and quantitative analysis, mainly using statistical indexes, has been carried out. As a first step a visual inspection of rainfall fields in the datasets has been done in order to understand the general behaviour and to identify, if possible, problems or drawbacks in the data. A synoptic comparison was conducted plotting together the rainfall estimates obtained by remote sensing tools (i.e. Microwave links and radar) with the reference field. Statistical indicators and continuous verification methods based on contingency table were calculated.

Moreover single event analysis was conducted in cases of false precipitation detection by gauges and ERG5, detection of abnormal attenuation by MWL due to the presence of snow or mixed-phase precipitation, undersampling of precipitation in convective season.

The agreement between MWL QPE and the other estimates is quite promising even if it requires a tuning activity in order to make the technology used in real-time or near real-time. The qualitative analysis shows that the performance of the MWL estimate seems to increase in the second half of the analysed period, mainly characterised by convective storms, even embedded in frontal structures, where showers and heavy rain play an important role.

This behaviour is confirmed by the quantitative analysis done by using statistical indicators, that improve in case of rainfall estimation from MWL data during Sum-

mer and Spring seasons. The validation has pointed out that Microwave estimation slightly underestimate precipitation occurrence both in spatial coverage and point amount, while Adjusted radar have a complementary features.

Spatial coverage of link network is an important point which should be addressed to enlarge coverage in future in order to increase the quality of the retrieved field. Further quality control procedures should be applied to reduce the impact of false signal which was used in the validation exercise. Two main topic should be tackled: identification of false signal due to structural deformation and snow-melting data.