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Analysis of high accuracy rain intensity measurements from a field test site

I. Gnecco (1), L.G. Lanza (1), L. Stagi (1), and E. Vuerich (2)

(1) University of Genova, DICAT, Genova, Italy (luca.lanza@unige.it, 39 010 3532481), (2) Italian Meteorological Service, km20,100 Braccianese Claudia, 00062 Bracciano, Italy

A large intercomparison effort of various types of rainfall intensity gauges is now under completion in Vigna di Valle, Rome (Italy), under the auspices of the World Meteorological Organisation (WMO). The performances of a total number of about 40 instruments are being assessed and validated, until April 2009, against a set of four reference pit gauges. A description of the rationale behind the WMO Intercomparison, the technical characteristics of the instruments involved, the field site preparation, installation and maintenance, the calibration and validation methods, the quality assurance procedures, and methods for the analysis of the results and intercomparison of the instrument performances can be found in previous related papers. Also, a few data from the initial rain events measured at the field site have been published already, together with their preliminary elaboration.

Installation of the instruments in the field was preceded by the laboratory calibration of all submitted catching type rain gauges at the University of Genoa, and periodic testing of these gauges by means of dynamic calibration was performed throughout the measurement campaign, using a portable calibration device. Calibration was performed at high resolution since the ongoing intercomparison in the field focuses on one-minute rainfall intensity data under real world conditions, and this time resolution was adopted as a recommendation for precipitation intensity measurements – with a maximum uncertainty of 5% – and published in the last revision of the WMO Guide to Instruments and Methods of Observation (WMO-No. 8, 7th edition).

In this work, high resolution (one minute) rain intensity data obtained from the instruments involved in the Intercomparison are used to investigate the spatial distribution of anomalies across the test site (against a given reference rain intensity value), after correction of the measured values is performed based on the laboratory results. Residual errors are therefore analysed by assessing their distribution in time and space, with specific reference to the correlation with suitable rain event characteristics (magnitude, intermittency, variability, etc.) and the available ancillary meteorological information (wind, pressure, temperature, etc.).