

## Laboratory assessment of two catching type drop-counting rain gauges.

Mattia Stagnaro (1,2), Arianna Cauteruccio (1,2), Matteo Colli (2), Luca G. Lanza (1,2), and Pak Wai Chan (3)

(1) University of Genova, Dep. of Civil, Chemical and Environmental Eng., Genova, Italy (mattia.stagnaro@unige.it), (2) WMO/CIMO Lead Centre “B. Castelli” on Precipitation Intensity, Italy, (3) Hong Kong Observatory, 134A Nathan Road, Hong Kong, China

This study reports the results of laboratory tests performed to assess the performance of three drop counting rain gauges of the catching type, and to propose suitable correction so as to make them compliant with the specifications of the World Meteorological Organisation (WMO) at one minute time resolution for Rainfall Intensity (RI) measurements. The tests were limited to the steady state conditions, with known and constant flow rates provided to the instrument at various reference intensities for a sufficient period of time, in order to compare the measures provided by the gauge with the reference figures (which is known as dynamic calibration).

The instruments investigated are manufactured by Ogawa Seiki Co. Ltd (Japan) and the Chilbolton RAL (UK). They are designed as high-sensitivity drop counter type rain gauges.

Using a suitable correction algorithm, based on calibration curves as obtained from the tests performed in the laboratory, it is possible to improve the accuracy of the three instruments and to obtain results that are fully compatible with the WMO required measurement uncertainty provided in the CIMO guide (WMO, Pub. No 8), although only within the acceptable measurement ranges.

The laboratory tests were performed under known and constant flow rates in closely controlled conditions, according to the recommended procedures developed during the WMO Laboratory Intercomparison of RI gauges and recommended by WMO. The performance in the field may be lower than those observed in the laboratory, due to errors induced by the atmospheric conditions, installation, status of maintenance, etc.