



An environmental chamber evaluation of weighing gauges performance at low rainfall intensity

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Contextually to the ongoing Solid Precipitation InterComparison Experiment (SPICE), the WMO experimental initiative concerning solid precipitation measurement instruments, the Lead Centre "B.Castelli" on Precipitation Intensity has recently conducted laboratory investigations to test the performance of the automatic weighing type (WG) gauges under controlled low rainfall intensity (RI) regimes.

The OTT Pluvio2 WG and the GEONOR T-200 vibrating-wire gauge (VWG) are currently employed as in-situ field reference instruments for the SPICE project activities. The choice is supported by the demonstrated good performance under previous constant flow rate calibration efforts. Notwithstanding the robustness of the results achieved in terms of time-averaged RI, the accuracy in measurement of real time low RI series at the time resolution of one minute was still unknown.

The evidence that instantaneous RI indications performed by the weighing sensors suffer from considerable dispersion around the mean value raised the necessity of collecting a consistent number of filtered samples (and waiting for a significant time interval) in order to obtain good estimation of the RI in averaged terms. In addition, the sensitivity of the gauges to disturbing factors such as the impact of the hydrometeors on the measuring buckets content, wind, temperature and non-perfectly-steady installation conditions would inevitably tend to amplify the scattering of RI measurements.

This work shows the preliminary results of this laboratory activity evaluated by aggregating the output of the Pluvio2 and T-200 RI measurements at a one-minute time resolution. The tests were carried out after installing the two instruments inside an environmental chamber located at the Italian Air Force Chemical Department of Pratica di Mare (Roma) and simulating a selection of constant reference RIs with a validated and remotely controlled flow rate generator. Another controlled parameter was the environmental temperature which allowed a comparative analysis between results obtained by setting different values inside the environmental chamber, which are representative of the real world snow and drizzle conditions.