Geophysical Research Abstracts
Vol. 18, EGU2016-15321, 2016
EGU General Assembly 2016

Assessing rainfall intensity calculation algorithms for tipping-bucket rain gauges at a field test site.

Mattia Stagnaro (1,2), Matteo Colli (1,2), Luca Lanza (1,2), and Pak-Wai Chan (3)

(1) University of Genova, Dep. of Civil, Chemical and Environmental Engineering, Via Montallegro 1, 16145 Genoa, Italy (mattia.stagnaro@unige.it), (2) WMO/CIMO Lead Centre "B. Castelli" on Precipitation Intensity, Italy, (3) Hong Kong Observatory, 134A Nathan Road, Kowloon, Hong Kong

From May to September 2013, a selected number of observed rain events has been selected in order to assess the effectiveness of the calculation algorithms employed to calculate the rainfall intensity (RI) for two tipping-bucket rain gauges (TBRs). For its accuracy and precision, a drop counter catching-type gauge has been selected as the working reference to perform comparisons with the two operational tipping-bucket rain gauges. The drop-counter field data have a time resolution of 10 s, while the actual time of tip is recorded for both TBRs; however, the time resolution employed for the calculation of the rainfall intensity is equal to 1 minute. Although the two TBRs have the same sensitivity of 0.1 mm, they are based on a different functioning system. One is a traditional TBR with a single bucket, while the other is characterized by two layers of buckets. The algorithm employed in the calculation of the rainfall intensity for both the TBRs is based on the assumption that the nominal volume of each bucket is uniformly distributed over the inter-tip period. In order to estimate the accuracy, a synthetic sequence of tip-times of an ideal TBR was derived from the drop-counter data for each selected event. The sensitivity of this ideal TBR is the same of the other two TBRs and equal to 0.1 mm. The performance of the two real TBRs were estimated from the direct comparison with the working reference. From the comparison between the real and the ideal TBRs, in terms of deviations from the average value, the effectiveness of the inter-tip algorithm is shown to be relevant up to mid-low values of rainfall intensity, while it decreases with further increasing the RI.