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Hydro-Meteorological Modeling and High Frequency Quality of Long Time Series

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High resolution, long and reliable rainfall time series are extremely important to assess reliable statistics, e.g. the Intensity-duration-Frequency curves that have been widely used to define design rainfalls and rainfall drainage network dimensioning.

The potential consequences of changes in measuring and recording techniques have been somewhat discussed in the literature, e.g. introduction of artificial breaks in time series. In this paper, we show how to detect another artificiality: most of the tipping-bucket time series have a lower recording frequency than that is assumed, furthermore the effective high-frequency limit often depends on the recording year due to algorithm changes.

This question is particularly important for urban hydrology, because an error on the effective recording high frequency introduces biases in the corresponding statistics. This question is particularly important for the estimation of rainfall extremes over increasing durations; and an error on the effective recording high frequency introduces biases in the corresponding IdF curves.

We present a simple automatic procedure to assess this frequency year by year and station by station on a large database. The results of scaling analysis showed also influences of high frequency on the scaling behaviour.