

Deutscher Wetterdienst

Abteilung Messnetze
und Daten
TI23, Messsysteme



Deutscher Wetterdienst - Postfach 650150 - 22361 Hamburg

Participants of the
WMO Field Intercomparison
Of Rainfall Intensity Gauges
In Vigna di Valle, Italy
2007-2008

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Further information to participants

Dear participants,

On a recent meeting of the WMO Expert Team and International Organizing Committee (ET/IOC) for the upcoming WMO Field Intercomparison in Italy 2007/2008 several important decisions have been made that I want to inform you of. If you encounter any problem with one of the following requirements, I ask you to contact me as soon as possible to find a solution.

The decisions and requirements are as follows:

- a) Manufacturers of reference gauges (Geonor, METEOSERVIS, ETG and CAE) are kindly asked to provide a 3rd gauge as a spare. Spare gauges are needed for fast replacement of faulty gauges. Provision of a spare instrument is advantageous because it allows reducing data gaps and downtimes for this instrument during this campaign.

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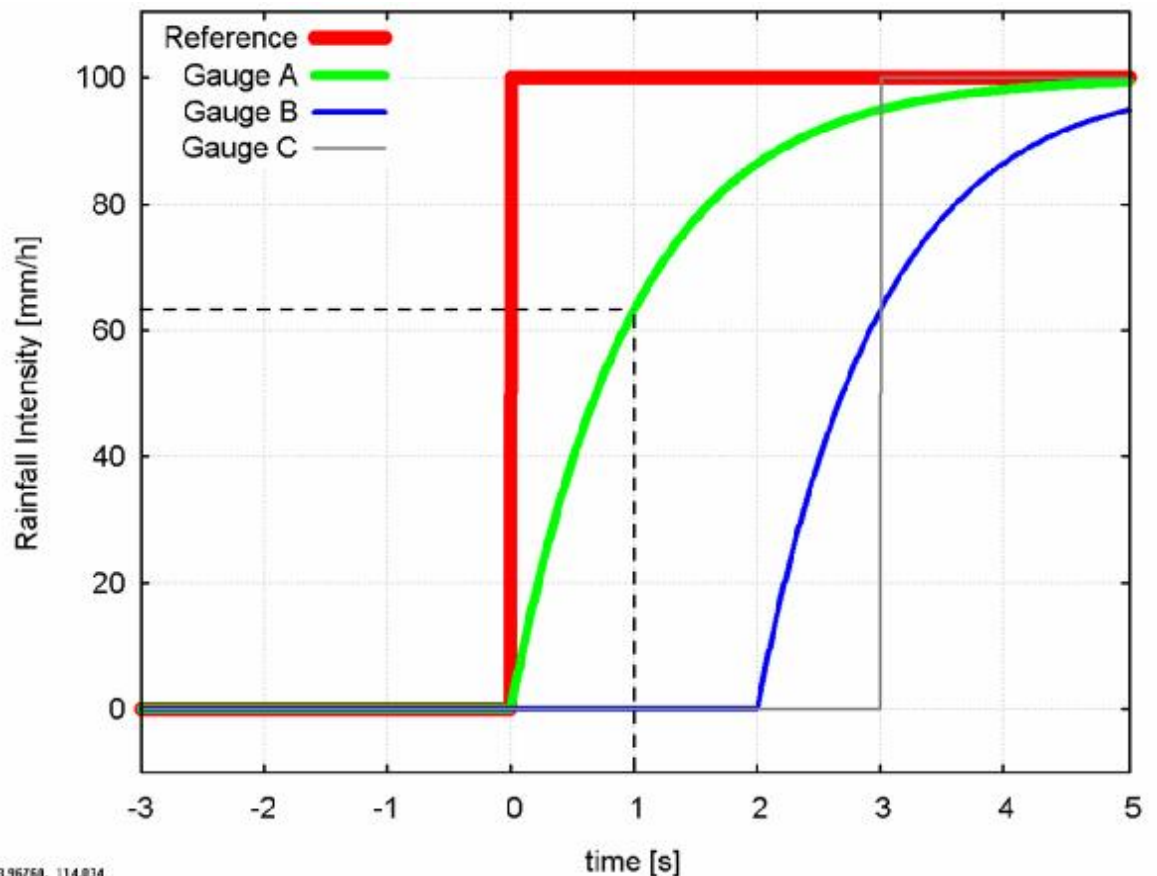
- b) All manufacturers shall provide an appropriate mast for installation of their instruments so that the “orifice/sensing” height is 1 m.
- c) Manufacturers are informed that no windshields will be used with instruments. This is to guarantee uniform measurements from all gauges as well as more uniform measurement field in the intercomparison site.
- d) Manufacturers are asked to provide a specific installation kit if necessary.
- e) Manufacturers are asked to assist in the installation, as appropriate to the field intercomparison protocols.
- f) Technical assistance by manufacturers may be requested throughout the intercomparison.
- g) In case the RI (rainfall rate per 1 minute) is not directly provided as an output of the measurement, the transfer function has to be given to derive RI at 1-min time resolution.
- h) In case of a serial output a detailed description of the data telegram has to be provided (or referred to in the manual).
- i) Manufacturers should provide a time-synchronized output with an update frequency of 1-minute. Therefore, the procedure to synchronise the observation interval to a reference has to be described.
To explain this: the reference clock will be provided by the data acquisition system (synchronised to a GPS clock). For optimal performance the observation cycle (cycle for measurement and calculation of the result) of your instrument should be synchronised to the cycle of the data acquisition system. This system allows the transmission of commands to the instrument for this purpose.
- j) Manufacturers should provide the response time of their instrument and the delay time for the RI output to allow an optimal synchronization with the reference for data analysis. It is required for all instruments that apply internal algorithms and filtering

techniques to calculate the rainfall intensity from the measured raw data (e.g. weights, volumes, etc...). Note that for tipping bucket gauges that do not apply any internal software correction no delay and response times can be given.

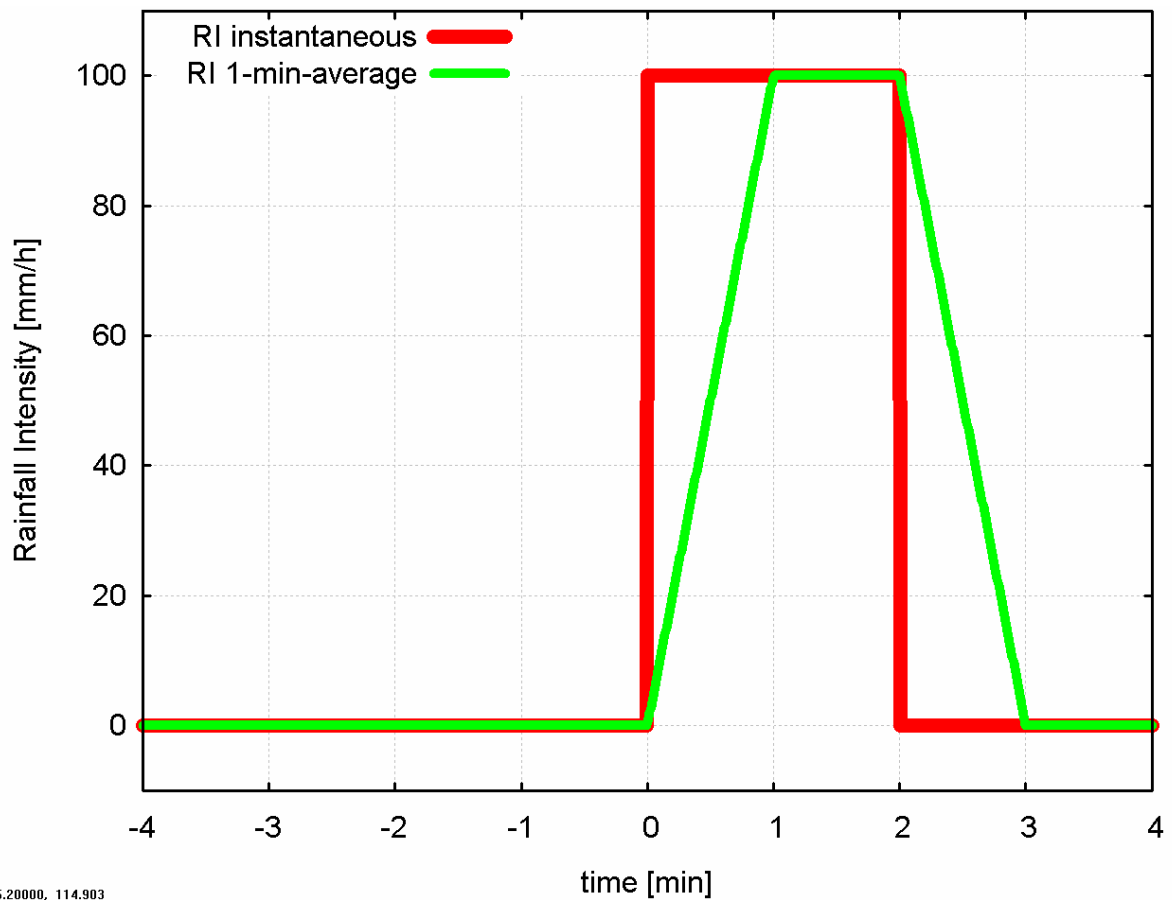
The graph below illustrates the required quantities. In this theoretical example a constant rainfall intensity of 100 mm/h starting at time $t=0$ is applied to several rain gauges. If the rainfall intensity is calculated and averaged over time intervals much smaller than 1 s (i.e. quasi instantaneously) the reference instrument (red curve) would ideally reproduce the step function of the rainfall that is “switched on” at $t=0$. Gauge A (green curve) has a time constant of 1 s, i.e. the output reaches the 63% level after 1 s, but it has no delay.

Gauge B (blue curve) has also a time constant of 1 s but additionally a delay time of 2 s.

Gauge C has a delay time of 3 s but its time constant is zero.



Please note that the above given “instantaneous rainfall intensity” does not comply with the WMO recommendation to provide 1-minute-averages. The second graph below illustrates the difference between the “instantaneous rainfall intensity” (red curve) with an averaging time $\ll 1$ s and the 1-minute-average rainfall intensity (green curve) that should be provided by the instruments.



-5.20000, 114.903

Kind regards,

Dr. Eckhard Lanzinger, Project Leader