RainGain Partners meeting

October 25-26, 2012 - Rotterdam

ir. Laurens Cas Decloedt
PhD researcher KU Leuven

Investing in Opportunities
This project has received European Regional Development Funding through INTERREG IV B.
INTERREG IVB

Overview

- Topic 1: Literature review document
- Topic 2: Dynamic calibration of TBR's

Review document

- Literature review document on:
  ‘Radar based fine scale rainfall estimation’
- Outcome of International workshop
  on fine scale rainfall estimation (Leuven)
- Will be distributed among partners & other
  interested researchers shortly

Laurens Cas Decloedt – KU Leuven

Review document

Focus of review document:

- Bridge the gap between the expertise fields of radar meteorology and urban hydrology, drainage and flood management and control
- Comprises the entire radar based rainfall estimation processing chain
- Give an overview of the methods applied in both research and practice
- Not: reproduce existing knowledge (summarize)

Review document

- Radar technology:
  - I. Introduction to radar technology
    Explanation on the differences in the types of weather radars
- Radar measurements:
  - II. Calibration of the radar
  - III. Corrections to the raw radar signal
  - IV. Influence of the scanning strategy on the rainfall estimates
- Rainfall estimation:
  - V. Conversion from radar measurements to rainfall
  - VI. Ground truthing and adjustments to the estimates
  - VII. Merging all data sources for fine scale rainfall estimation

Overview

- Topic 1: Review document
- Topic 2: Dynamic calibration of TBR's

Calibration of TBR's

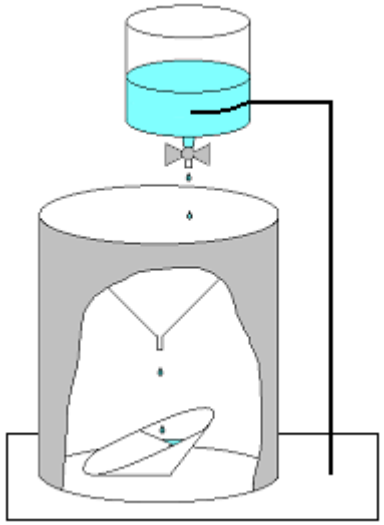
At high rainfall intensities TBR's have a known problem (underestimation) due to the water loss during the tip

→ This can be corrected with dynamic calibration

- Simulate a precipitation event with a known volume and calculate the volume offset y with the rain gauge
- Do this for a range of rainfall intensities

Measured Volume: $V_{TBR} = R \,.\, n \,.\, \frac{\pi \,.\, D_{TBR}^2}{4} \quad [mm^3]$

Volume offset: $y = \frac{V_{TBR} - V_{Sim}}{V_{TBR}} \quad [\%]$

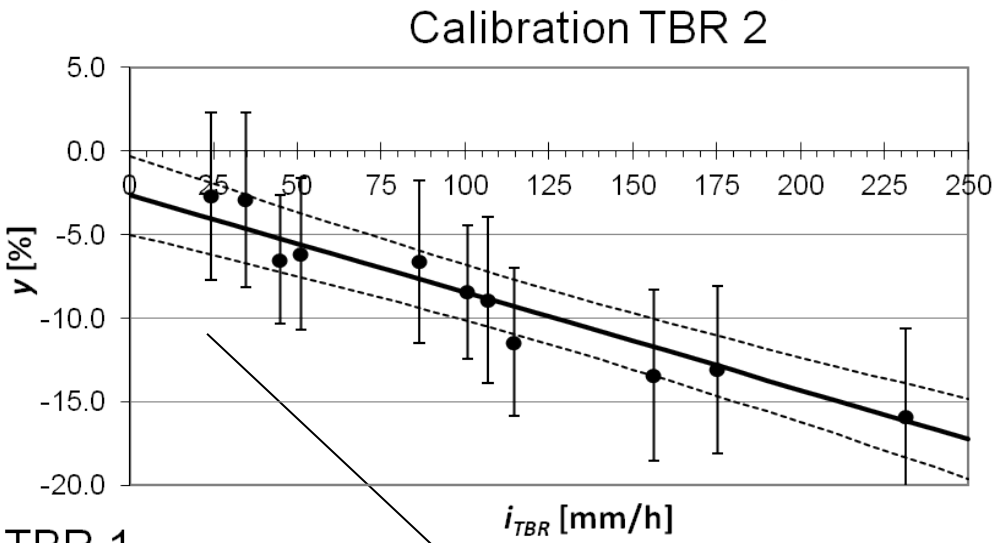


Calibration of TBR's

Some results:

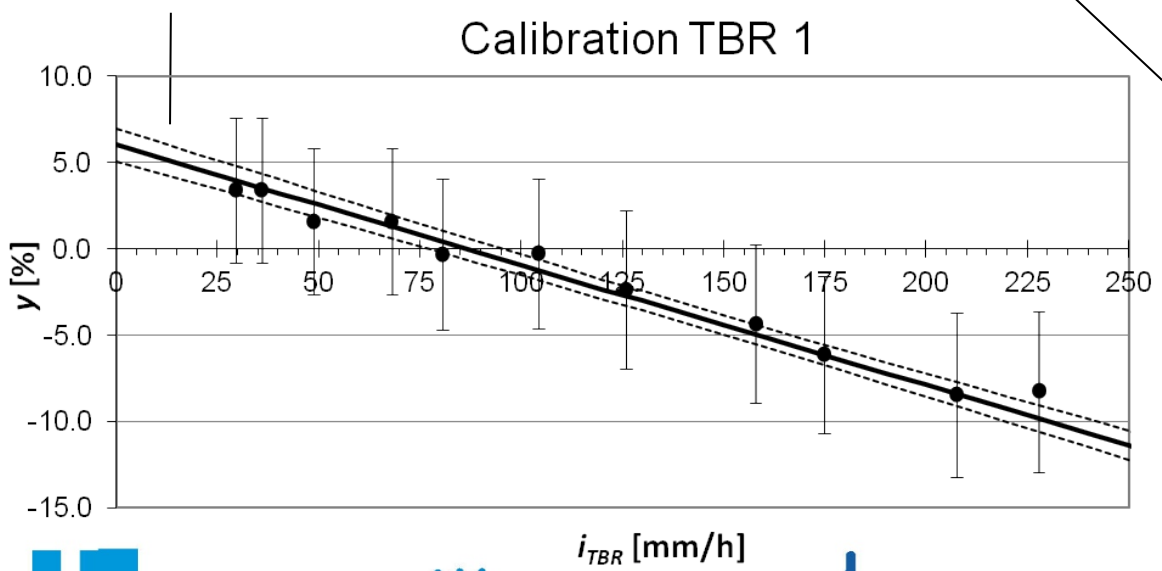
Regression curve:

$$y = K.\, i_{TBR} + b$$

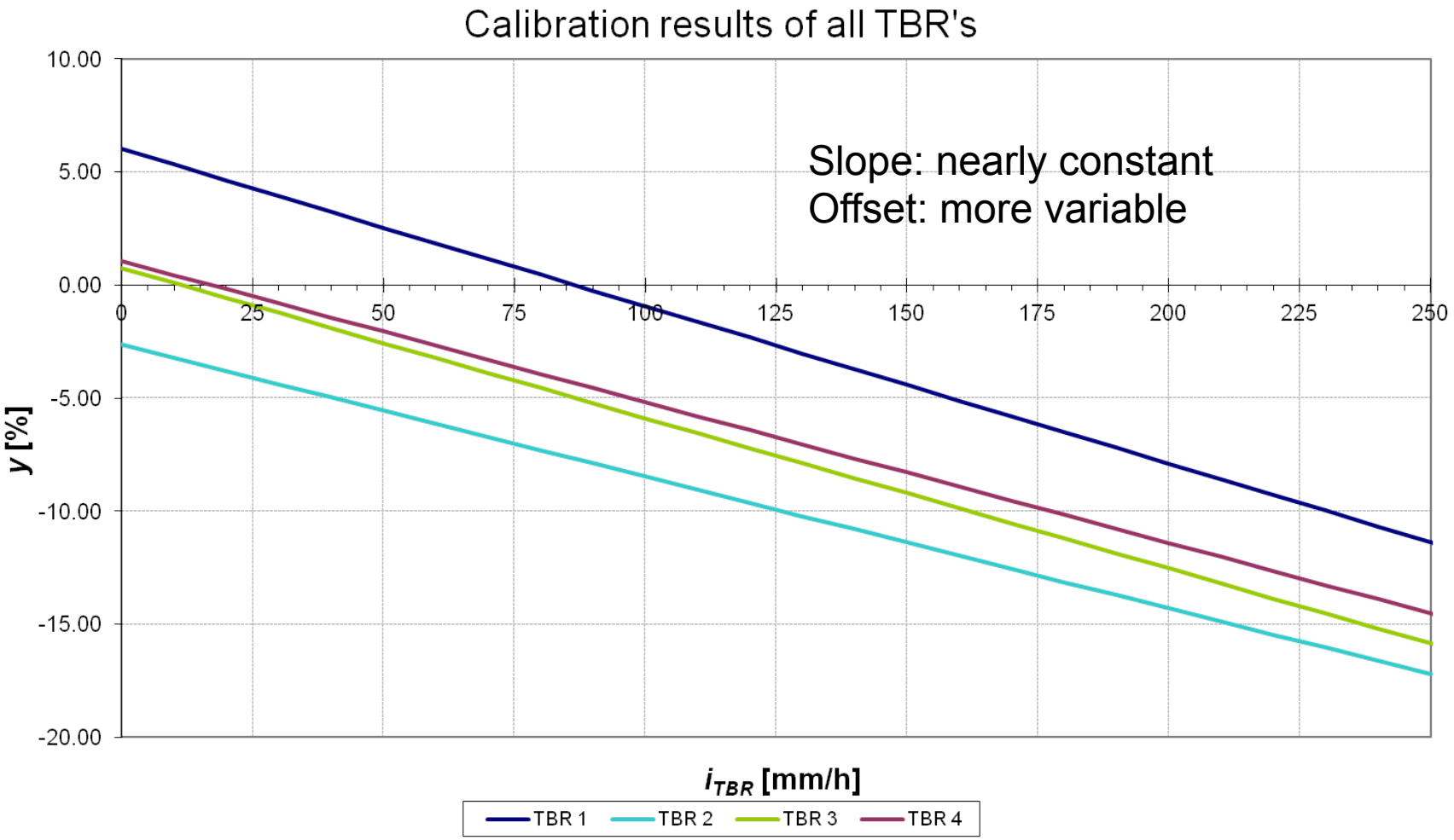


Overestimation

Underestimation



Calibration of TBR's



Calibration of TBR's

Correct rainfall estimates from TBR's with known volume underestimation:

$$\text{Regression curve: } y = K.\, i_{TBR} + b \ [\%]$$

$$\text{Correction curve: } i_{Real} = \left(1 - y/100\right).\, i_{TBR} \ [\text{mm/h}]$$

$$= \left(1 - {}^{b}/_{100}\right).\, i_{TBR} - {}^{K}/_{100} \cdot i_{TBR}^{2}$$

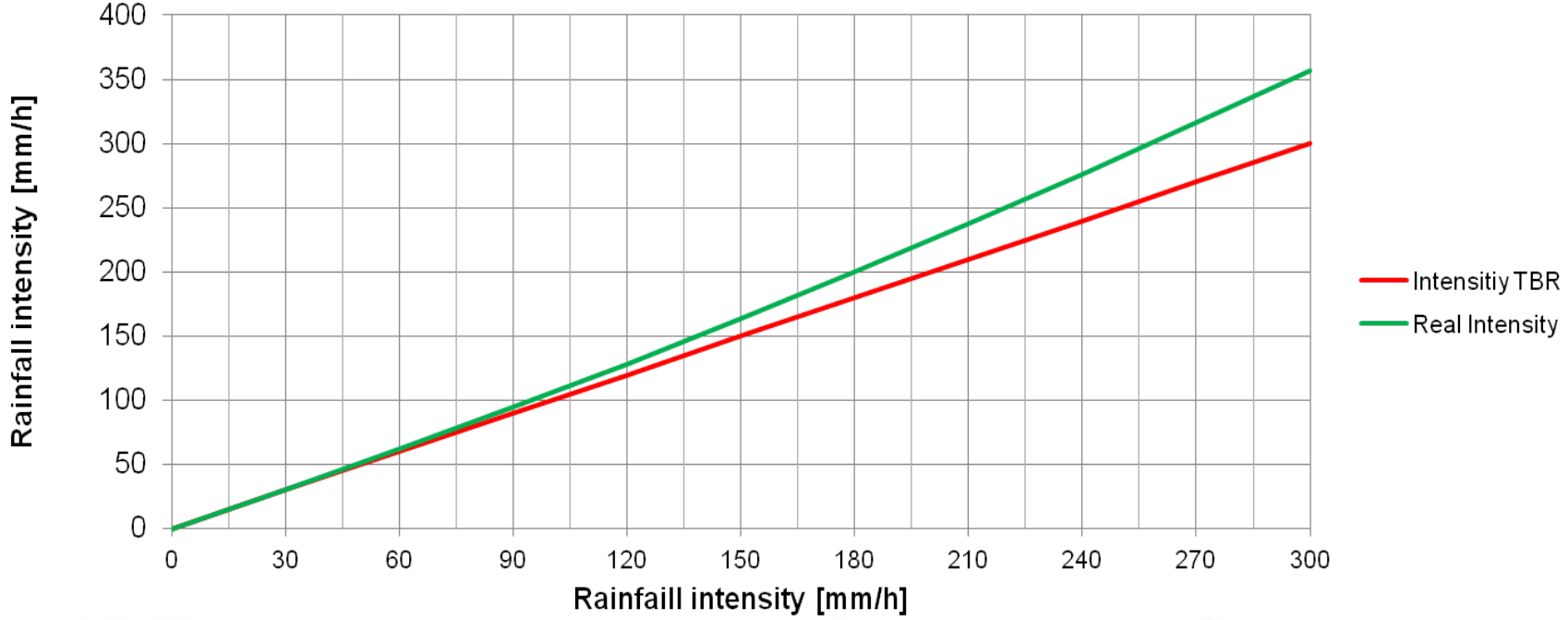
The procedure also checks the quality of the measurements at low rainfall intensities (both under- and overestimations occur)

Calibration of TBR's

Example: TBR nr. 3

Correction curve: $i_{Real} = (1 - y).\, i_{TBR}$ [mm/h]

$= 0.99235.\, i_{TBR} + 0.00066.\, i_{TBR}^2$



Thank you for your attention

Questions, remarks, suggestions?

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