WP2: Fine-scale rainfall data acquisition and prediction:

Proposal:

- Share algorithms of methods for:
  - ✓ Raw radar data correction (e.g. clutter correction)
  - ✓ Radar adjustment to rain gauges (MFB, Range-dependent, Brandes, quantile mapping, …; static-dynamic adjustment, …)
  - ✓ Rain gauge interpolation adjustment to radar (kriging: KRE, KED; …)
  - ✓ Radar – rain gauge merging (co-kriging, Kalman filter, + local singularity analysis)
  - ✓ Rain gauge interpolation
  - ✓ (Rain gauge error estimation)
  - ✓ (Radar error estimation; for local ground level rainfall intensities)

WP2: Fine-scale rainfall data acquisition and prediction:

Proposal:

- Inter-comparison of methods, applicability and results (quality) in the pilot cases
  - ✓ Organize separate WP2 workshop on this (Jan-Feb 2014)?
  - ✓ Systematic research plan -> guidelines & publication(s)

WP2: Fine-scale rainfall data acquisition and prediction:

Fine-scale rainfall estimation: different steps

- **Radar adjustment: Corrections to the raw radar signal**
- **Radar adjustment: Corrections to rain gauge measurements**

OR

- **Radar – rain gauge integration**

- **Downscaling**

WP2: Fine-scale rainfall data acquisition and prediction:

Radar adjustment: Corrections to the raw radar signal

- Noise cut off
- Volume correction
- Attenuation correction
- Clutter correction

WP2: Fine-scale rainfall data acquisition and prediction:

Radar adjustment: Corrections to rain gauge measurements

- Statistic or dynamic correction (or combined)

- Mean field bias correction
- Range-dependent adjustment
- Brandes correction
- Quantile mapping

- Kriging with radar-based error correction (KRE)
- Kriging with external drift (KED)
- Regression kriging

WP2: Fine-scale rainfall data acquisition and prediction:

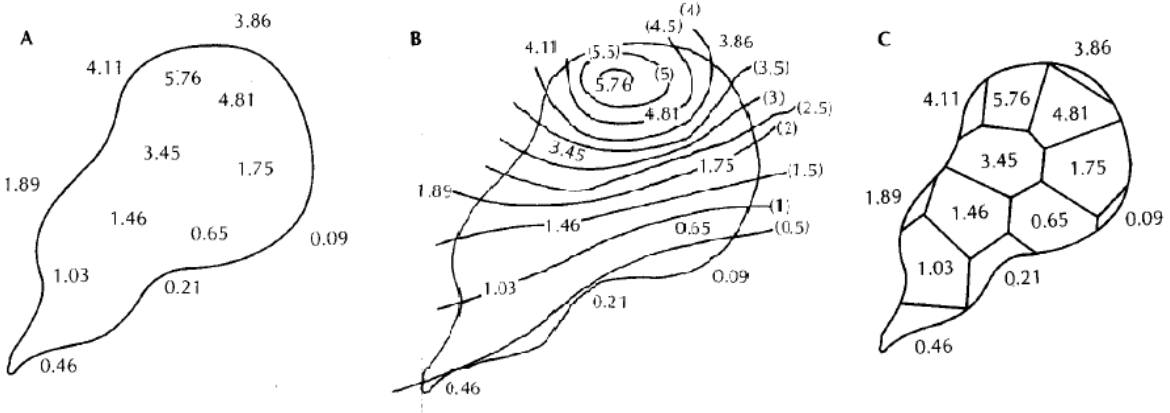
Radar – rain gauge integration (merging, based on error variance minimization):

- Co-kriging
- Kalman filter (taking radar and rain gauge measurement errors or uncertainties into account), Bayesian approach
- + Local singularity analysis

WP2: Fine-scale rainfall data acquisition and prediction:

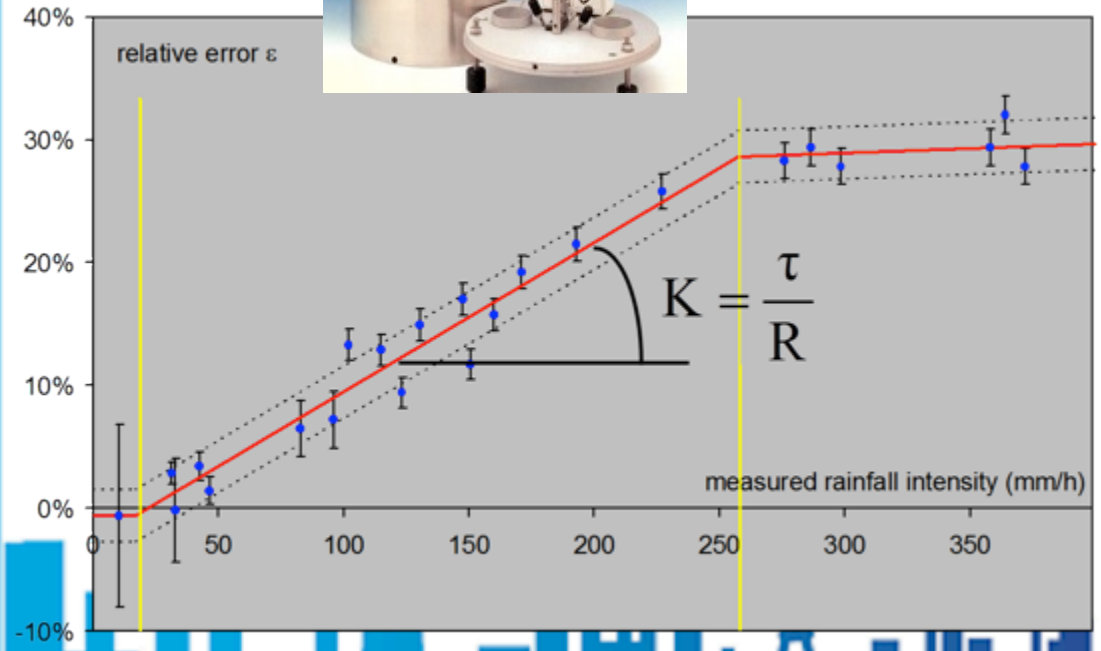
Rain gauge interpolation:

- Thiessen polygon method
- Isohyetal method
- Inverse distance weighting
- Kriging



WP2: Fine-scale rainfall data acquisition and prediction:

Rain gauge error estimation

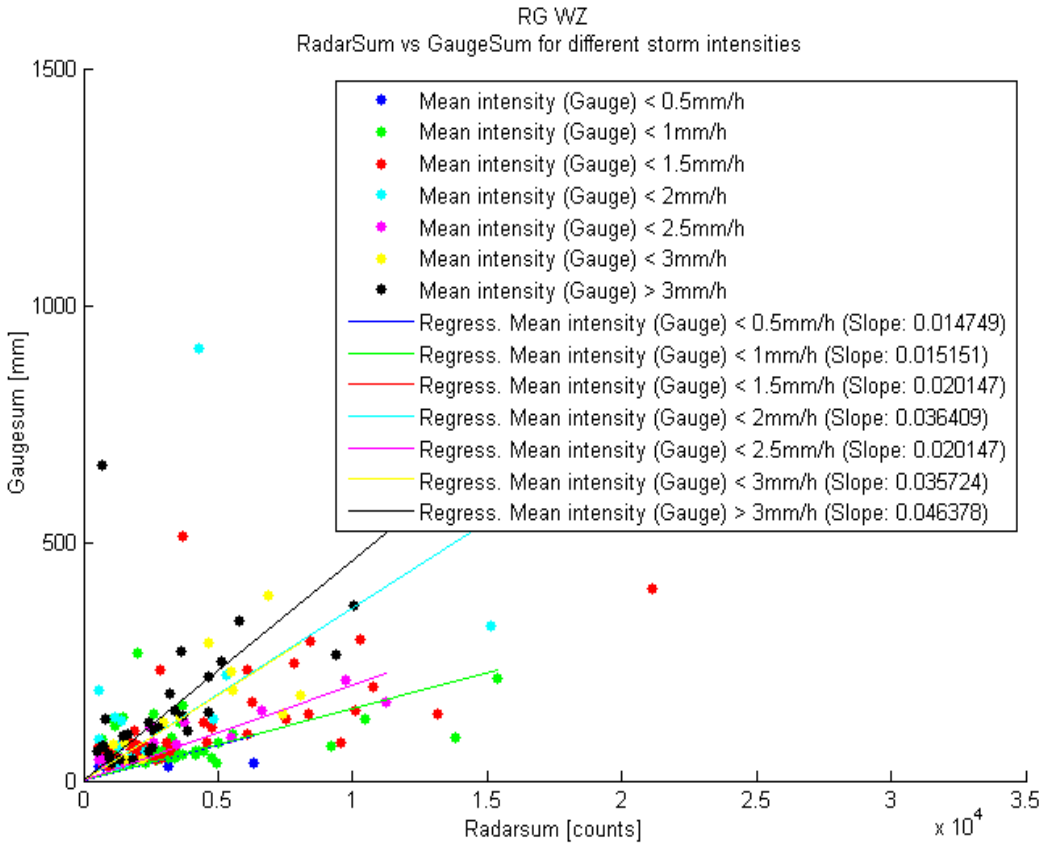


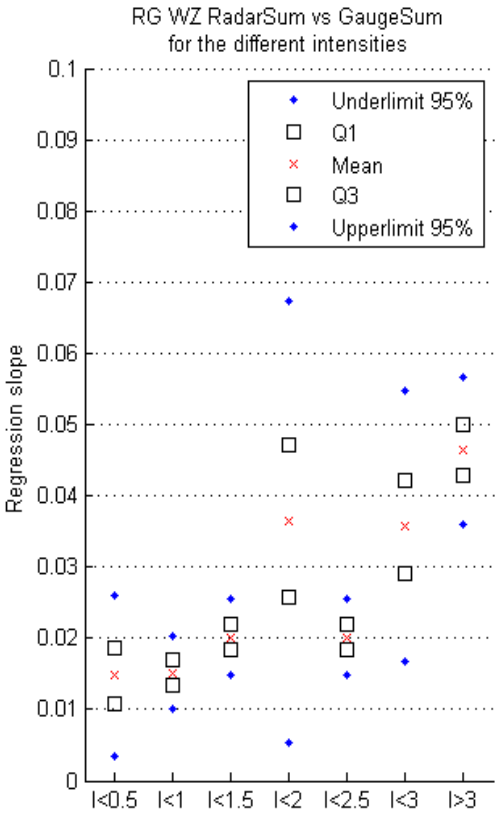
Accuracy tipping-bucket rain gauges:

- resolution R (0.1 mm, 0.2 mm, 0.5 mm)
- uncertainty calibration curve (± 1%)
- influence of wind and local disturbances (± 3 to 5%)

WP2: Fine-scale rainfall data acquisition and prediction:

Radar error estimation





WP2: Fine-scale rainfall data acquisition and prediction:

Downscaling:

- Empirical transfer functions (generalized linear models, quantile mapping, neural network models, …)
- Resampling, weather typing
- Stochastic disaggregation methods:
  - Based on point process theory
  - Cascade or multifractal methods

Rain Gain

Investing in Opportunities

This project has received European Regional Development Funding through INTERREG IV B.

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INTERREG IVB

WP1 & WP2:

RainGain fact sheets on "rain gauge measurements in urban areas"

Proposed outline:

- ✓ Different types of rain gauges
- ✓ Installation - location and surroundings
- ✓ Calibration
- ✓ Data retrieval
- ✓ Maintenance

No theoretical guidelines, but examples of "good practices" from RainGain pilot sites