

Marie-claire ten Veldhuis¹ Cedo Maksimović², Daniel Schertzer³, Patrick Willems⁴

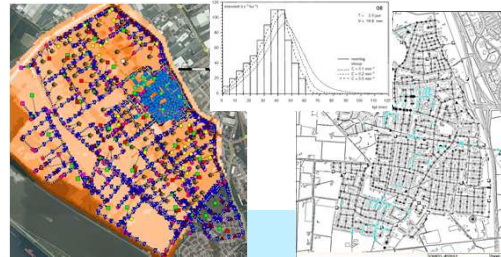
¹Delft University of Technology, NL ²Imperial College London, UK ³Ecole des Ponts-ParisTech, FR ⁴KU Leuven, BE

Extreme rainfall and flooding in the city



Rotterdam City, July 2011

The RAINGAIN project aims to analyse the applicability of new weather radars technology in the context of urban hydrological modelling. C-band and X-band radars and a network of rain gauges will be implemented in four highly urbanised catchments in NW Europe to analyse their capability to accurately estimate and predict urban rainfall at high resolution (<5 min; <100mx100m).



Oranjepolder: 490 ha Prinsenbeek: 100 ha

Urban areas: high imperviousness, high spatial variability → required data resolution << 1 km in space; < 5 min in time



Urban flood modelling: high resolution versus short calculation times: Hybrid 1D/1D + 1D/2D simulation

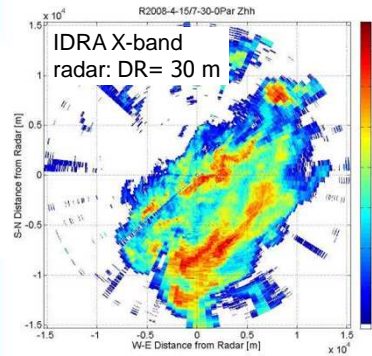
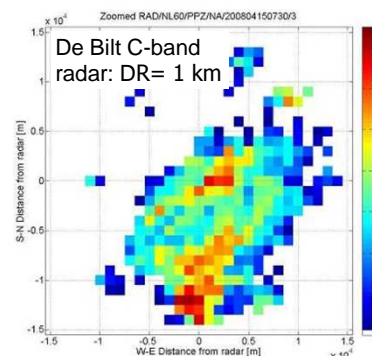
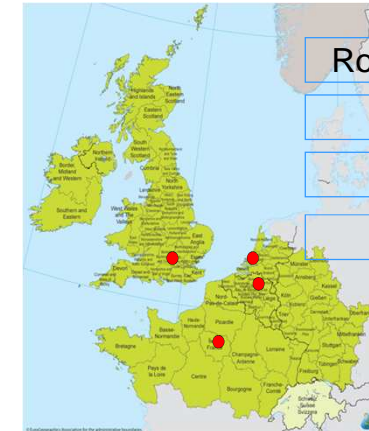


Illustration of high resolution reflectivity image for polarimetric X-band radar (IDRA Cabauw)
Courtesy: KNMI



RainGain: 13 partners:
Xband/Improved Cband radars in
4 Pilots:



Rotterdam (NL)

Leuven (BE)

Paris (FR)

London (UK)

- WP1: Installation and testing of radars
Lead: ParisTech (D. Schertzer)
- WP2: Fine-scale rainfall estimation and forecasting
Lead: KU Leuven (P. Willems)
- WP3: Urban flood modelling and prediction
Lead: Imperial College of London (C. Maksimovic)
- WP4: Implementation of fine-scale rainfall estimation and flood modelling in urban water management practice. Lead: TU Delft (M. ten Veldhuis)

Research challenges:

- Integration of Cband-Xband-radar data and rain gauge data
- High resolution radar-rainfall estimation in urban environment (clutter, local variability)
- Rainfall forecast at high resolution for urban areas
- Flood modelling and prediction at street scale and lead time > hour
- Trade-off modelling accuracy versus calculation time
- Implementation of high resolution rainfall and flood data in operational water control