

RainGain 4th (Final) UK National Observers' Group (NOG) Meeting

Friday 11th September 2015
Imperial College London



The RainGain Project

(Sep 2011 – Oct 2015)

Objective:

To improve fine-scale measurement of rainfall with the final aim of enhancing urban pluvial flood modelling, prediction and management



CITY OR COUNTY
COUNCIL



Environment
Agency



4th (Final) UK National Observers' Group (NOG) Meeting



- **NOG 1 (Feb 2012):**
 - General introduction to the project.
 - Identification of main challenges and research needs in urban pluvial flood modelling, forecasting and management
- **NOG 2 (Apr 2013):**
 - Experts and managers from across UK, France, Belgium and the Netherlands.
 - Approaches for local surface water flood warning systems were discussed.
- **NOG 3 (Mar 2014):**
 - Identification of decision making criteria to inform a cost/benefit analysis for implementation of local surface water flooding forecasting systems.



RainGain Final UK National Observers' Group Meeting

Friday 11th September 2015

10:00	Welcome and introduction (Susana Ochoa-Rodriguez, Imperial College London)
10:10	Overview of the RainGain project (Marie-Claire ten Veldhuis – RainGain Project Coordinator, TU Delft)
10:25	Radar technologies to obtain higher resolution rainfall estimates suitable for urban hydrological applications (Katie Norman, Met Office & Susana Ochoa-Rodriguez, Imperial College London)
11:15	<i>Tea & coffee</i>
11:30	Post-processing of radar rainfall estimates to enhance their accuracy and applicability for urban hydrology (Christian Onof, Imperial College London & Sharon Jewell, Met Office)
12:00	High-resolution urban drainage (flooding) simulation (Susana Ochoa-Rodriguez, Imperial College London)
12:30	<i>Lunch</i>
13:15	Place-Based Flood Resilience: Technology and governance (Andy Johnston & Andrew Walker, Local Government Information Unit)
13:45	RainGain Team Q&A Session - Chaired by Graeme Boyce, Flood Forecasting Centre
14:15	Stakeholders' presentations: <ul style="list-style-type: none"> Robert Moore, Centre for Ecology and Hydrology Johan Verlinde, City of Rotterdam Graham Squibbs, Representative of CIEWM Urban Drainage Group David Stewart, Torbay Council Michael Cranston, Scottish Environment Protection Agency
15:00	<i>Tea & coffee</i>
15:15	Stakeholders' panel discussion (chaired by Alex Nickson, Greater London Authority)
16:00	Close

Overview of the RainGain Project

Marie-Claire Ten Veldhuis
Project Coordinator
TU Delft, NL





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*High resolution rainfall observation
for enhanced urban flood risk
management*



supporting cities to cope and adapt



High resolution rainfall radar for urban flood modelling and prediction



Xband/Improved Cband
radars in 4 Cities:

Rotterdam (NL)

Leuven (B)

Paris (F)

London (UK)

RAINGAIN: 13 Partners

- 1) TU Delft (NL)
- 2) Zuid-Holland Province (NL)
- 3) Gemeentewerken Rotterdam (NL)
- 4) KU Leuven (BE)
- 5) Aquafin NV (BE)
- 6) Ecole des Ponts ParisTech (FR)
- 7) Marne-la-Vallée (FR)
- 8) Seine-St.-Denis (FR)
- 9) Météo France (FR)
- 10) Véolia (FR)
- 11) Imperial College London (UK)
- 12) Met Office (UK)
- 13) Local Government Flood Forum (UK)

4 Pilots cities:

Rotterdam (NL)

Leuven (BE)

Marne-la-Vallée (FR)
Seine-St.-Denis (FR)

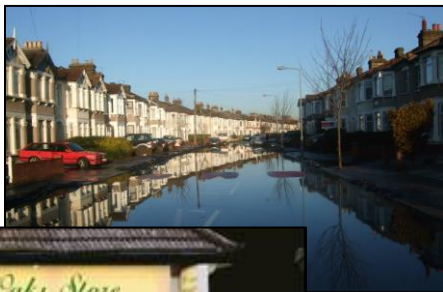
Croydon (UK)
Redbridge (UK)

High resolution radars in 4 cities:

- Leuven: new algorithms existing Xband radar, single pol
- London: tests Xband radar, single pol; Cband network, superresolution
- Paris: new, dual pol Xband radar installed in May 2015
- Rotterdam: new, dual pol Xband radar constructed, installation ongoing



10 PILOT LOCATIONS IN 4 CITIES



10 PILOT LOCATIONS IN 4 CITIES

London, sloping catchments, densely populated:
Cranbrook (Redbridge);
Purley (Croydon);
Torquay: very steep, coastal town



Leuven - Herent: mildly sloping, semi-urbanised

Rotterdam, polder areas (≈ 0 slope):
Centrum, Kralingen, Spaanse Polder

Paris: Morée-Sausset, flat, N of Paris;
Jouy-en-Josas, steep, partially urbanised, S of Paris;
Sucy-en-Brie: plateau/steep slope, SE of Paris



Pilot location



Fine-scale rainfall measurement and prediction to enhance urban pluvial flood management

Pilot location: Centrum, Rotterdam, NL

Location and



Fine-scale rainfall measurement and prediction to enhance urban pluvial flood management

Pilot location: Sucy-en-Brie Catchment, Paris area (France)

Location and Environmental Setting

Sucy-en-Brie is a city located in the South-East of Paris, in the Val-de-Marne County. The catchment is a 269 ha urban area, with an average coefficient of imperviousness of approximately 35%. The sewer system is a separate one and storm water is routed to the Marne River, that is one of the two main rivers of the Paris Region. The General Council of Val-de-Marne manages and controls the main sewer system and is in charge of protecting people and facilities against flooding, as well as of protecting the natural environment from pollution sources. According to the topography, three areas can be identified in the Sucy-en-Brie catchment: a plateau in the upstream with an elevation of approximately 100 m, an alluvial plain in the downstream near the Marne river with an elevation of 32 m and between them there is a hillside with a steep slope. The plateau and the hillside are housing areas (collective at 10% and individual at 90%) surrounded by green spaces, the plain is occupied by an industrial area and some sports fields.

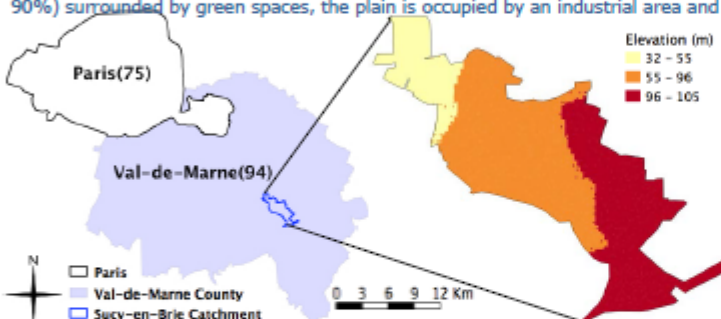


Figure 1: Location, topography and pictures of the Sucy-en-Brie catchment.



Figure 2: Map of the sewer system of the Centrum catchment

The district has rainfall, excess stored. For the built by Rotterdam capacity of 10



Urban pluvial flood risk p

Past flood problems

3rd May 2012: heavy rain occurred during the night and caused flooding on Van Vollenhovenstraat (water on the street and flooded basements), in the Southern part of the district. This pluvial flood was partly caused by failure of the sewer system.

28th December 2003: Many reports of flooding on Koningin Emmalein, in the Southern part of the district; water in basements and houses due to intense rain. Approximately 50 households and commercial buildings were affected.



Urban pluvial flood risk problems and management objectives

Flooding mechanisms:

Sucy-en-Brie catchment has suffered from several flooding events in the past as a consequence of:

- 1) The very steep slope in the hillside ($\approx 34\text{m/km}$) that increases water speed and causes overflows in the downstream pluvial network. Hence the plain (the area near the train station) is historically known as a flood zone.
- 2) The increase of imperviousness areas, however limited in this catchment.

Current Solution:

After the flooding of the 7th of July 2000, the General Council of Val-de-Marne decided to build a retention basin near the Sucy train station. This basin has two compartments that carry out two functions: (1) the protection against flooding by storing

Urban flood problems:

The last major event occurred on the 7th of July 2000, the study area was flooded because of a rain event, during which a nearby gauge recorded 84 mm of rainfall. Some houses and streets were flooded; the Sucy train station was also flooded and it remained closed for few days. This affected a significant portion of the population especially the commuters who had to use other means of transportation to reach Paris.



Rainfall

Rain gauges:

- 6 tipping bucket over the 110 l

Radars:

- C-band radar France covers and Doppler resolution is 1
- X-band radar: des Ponts Par catchment. The min in time.



Figure 8: Position of the SIAVB (the studied cat

The spatial data, which French National Institute - Land use cover: the - Digital elevation model with a vertical precision of 1 with a vertical precision available for this area.





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



INTERREG IVB

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Four cities gain rain

RAINGAIN is a transnational project aimed at improving the prediction of pluvial floods in our cities. RainGain develops and tests innovative tools and practices based on the use of high resolution radars in four pilot cities: Leuven, London, Paris, Rotterdam. *(Image: © Passyflore)*

[Read More](#)

www.RainGain.eu

Thank you

Enjoy the RainGain UK
National Observer Group day

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