Minutes of the First RainGain National Observers Group Meeting (UK)

Prepared by Susana Ochoa Rodríguez and Laurie Thraves

Date: Wednesday 29th February 2012, from 09:30 to 15:30

Venue: WSP House, 70 Chancery Lane, London, WC2A 1AF, UK

Purpose of the meeting:

- To introduce the RainGain project to a group of national observers comprising specialists, practitioners, academics and local and central government policy-makers
- To discuss the observers' expectations from the RainGain project, regarding potential improvements in modelling, forecasting and management of urban pluvial flooding
- To give the observers the possibility of getting involved in the RainGain project

Present:

Name	Organisation	Job Tile
Laurie Thraves	LGiU	Policy Manager
Barry O'Brien	LGiU	Policy Assistant
Susana Ochoa Rodriguez	Imperial College London	Research Assistant
Prof Cedo Maksimovic	Imperial College London	Professorial Research Fellow
Neil McIntyre	Imperial College London	Reader
Chris Onof	Imperial College London	Senior Lecturer
Li-Pen Wang	Imperial College London	Research Student
Patricia Mackenzie	MET Office	Senior Project Manager
Malcolm Kitchen	MET Office	Head of Observations
Timothy Darlington	MET Office	
Dr Jacqueline Sugier	Met Office	Science Manager
Dr Marie-Claire ten Veldhuis	TU Delft	
David Carlisle	London Borough of Croydon	Town Planner
Miguel Rico-Ramirez	University of Bristol	Lecturer
Andy Palmer	AECOM	Director
Paul Davies	Arup	Associate
Simon Bunn	Cambridge City Council	
Andy Naish	Environment Agency	Flood Warning and Management
Richard Cross	Environment Agency	Flood Forecasting
Joanne Coles	Environment Agency	Flood Forecasting
Stephen Merrett	Environment Agency	Warning and Informing Senior Advisor

Name	Organisation	Job Tile
Edward Clarke	Essex County Council	
Louise Clancy	Greater London Authority	Community Flood Plans
Philippe Desorgues	Greater London Authority	Intern
Andy Hardstaff	Hertfordshire County Council	Flood and Water Management Officer
Andrew Walker	Innovyze	Client Service Manager
Paul Eccleston	JBA Consulting	Principal Analyst
Cllr Roger Thomas	LGA Coastal Issues SIG	Chairman
John Martin	London Borough of Redbridge	Drainage Manager
Lachlan Attwooll	London Borough of Redbridge	Senior Emergency Planning Officer
Mark O'Brien	London Fire Brigade	Station Manager
David Balmforth	MWH Global	
Chris Collier	NCAS University of Leeds	Head of Strategic Partnerships
Richard Allitt	Richard Allitt Associates Ltd	Director
Dr Monika Pfeifer	Selex Systems Integration	Marketing and Sales Manager
Owen Lee	Surrey County Council	Highways Asset Planning
David Stewart	Torbay Council	Service Manager Engineering
Anna Romanova	University of Bradford	Research Student
Alma Schellart	University of Bradford	Lecturer Civil and Environmental Engineering
James	Veatch	Chief Engineer
Tom Palmer	Worcestershire County Council	Flood Risk Management
David Fortune	XP Solutions	Director of Innovation
James Cullinane	Imperial College London	MSc Student
Ying Zhang	Imperial College London	MSc Student
Fan Zhang	Imperial College London	MSc Student
Xi Liu	Imperial College London	MSc Student

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1. Opening of the meeting

Opening and welcome by Laurie Thraves (Local Government Flood Forum)

2. Introduction to the RainGain project and the role of the UK partners in it

Presentations were given by Dr. Marie-Claire Ten Veldhuis (general coordinator of the RainGain project) and by representatives of the three UK partners of the RainGain project:

- Timothy Darlington (The UK Met Office)
- Prof. Cedo Maksimovic (Imperial College London)
- Laurie Thraves (Local Government Flood Forum).

The presentations were followed by a questions/answers session**. These presentations will be circulated** amongst attendees; however, a brief summary of the main points of each of the presentations is next provided.

2.1. Presentation by Dr. Marie-Claire ten Veldhuis: Introduction to the RainGain Project

- **Objective of the RainGain Project:** to improve fine-scale measurement and prediction of rainfall and to enhance urban pluvial flood prediction in order to enable urban water managers to adequately cope with intense storms, so that the vulnerability of populations and critical infrastructure can be reduced.
- The RainGain project is part of the Interreg IVB Programme, it started in September 2011 and will last 4 years
- The project comprises 13 partners from 4 EU countries (GB, FR, NL, and BE)
- The work is split into 4 workpackages:
  - **WP1:** Installation and testing of radars - **Lead:** ParisTech, Daniel Schertzer
  - **WP2:** Fine-scale rainfall data acquisition and prediction - **Lead**: KU Leuven, Patrick Willems
  - **WP3**:Urban pluvial flood modelling and prediction - **Lead:** Imperial College of London, Cedo Maksimovic
  - **WP4:** Implementation of fine-scale rainfall data, flood modelling and prediction into urban water management practice **- Lead:** TU Delft, Marie-claire ten Veldhuis

2.2. Presentation by Timothy Darlington (UK Met Office):

- Timothy introduced the existing radar network of the UK Met Office, formed by 17 C-band radars
- A radar renewal project is ongoing, which includes upgrade of all radars to Dual Polarisation, installation of new modern motors, drive systems and transmitters.
- The UK Met Office has an in-house processing and control system called Cyclops. Having this system enables access to the whole signal processing chain and makes it possible to implement changes throughout this chain.
- **Research focus of the UK Met Office within the RainGain project**: improving rainfall estimates for hydrological modelling using conventional weather radars. This includes finer temporal and

spatial resolution, more effective quality control and target type discrimination, as well as improved accuracy of rainfall estimates through raingauge radar merging techniques.

- The partnership of the RainGain project will enable sharing information on the relative merits of X and C-band radars (X-band radars will be installed in other participating countries, whereas in the UK, the existing C-band radars will upgraded).

2.3. Presentation by Prof. Cedo Maksimovic (Imperial College London):

- Prof. Maksimovic introduced the ongoing work at Imperial College London and explained the concept and characteristics of surface/pluvial flooding and the requirements for properly modelling and forecasting this type of flooding.
- Surface/pluvial flooding is caused by intense local storms during which the capacity of the sewer network and of the surface drainage system is exceeded. This type of flooding takes place quickly and at small temporal and spatial scales; therefore, the flood models and the rainfall forecast must be fast and must provide accurate information at these small scales.
- Until recently, it seemed impossible to forecast this type of flooding, but recent developments have shown that it can be done, at least with small lead times (allowing for quick and strategic measures to be implemented in order to reduce flood damage).
- With the purpose of complying with the requirements imposed by surface/pluvial flooding, the Urban Water Research Group (UWRG) of Imperial College London is developing techniques for improving accuracy and resolution of rainfall estimates (downscaling and raingauge-radar merging techniques) and is also developing flood models which keep a balance between accuracy and runtime (e.g. 1-D models of the urban surface, hybrid models, etc.).
- Another activity that will be developed as part of the RainGain project is the implementation of a pilot platform for automatically linking rainfall inputs to urban pluvial flood models. In addition, the uncertainty associated with the final flood estimates and forecasts will be analysed and practical recommendations on the use of the available estimates will be made.

2.4. Presentation by Laurie Thraves (Local Government Flood Forum):

- The Local Government Flood Forum (LGFF) works to ensure that councils have a strong voice on flooding and, increasingly, the management of water resources as a key local natural resource. It provides a forum for local government, central government, national agencies and the private and voluntary sector to share best practice on managing flood risk and coastal erosion.
- The work of the LGFF on the RAINGAIN project will be focused on supporting Work Package 3: "Implementation of rainfall data in existing urban water models to enhance short term pluvial flood modelling and prediction". The objective is to support the use of fine-scale urban pluvial flood prediction models by professionals at the local and regional level.
- Why does the RainGain project have the potential to make a difference to local government? The UK faces two related challenges that will make accurate flood risk modelling at the community level more important. First, climate change. The Climate Change Risk Assessment estimates up to a ten-fold increase in damages to property as a result of flooding by 2080.

- This increase in flooding is, however, coupled with an unprecedented squeeze on public spending, which means that significant investment in flood defences is not likely. An increase in flooding, coupled with a decrease in public money, means that communities and individuals will need to play a greater role in protecting themselves and building resilience to flooding (a "Big Society" approach). Their ability to do so relies on accurate community level flood risk management information.
- Local authorities will play a vital role in leading the creation of accurate community flood risk management information and supporting the development of community flood plans. Local government is uniquely placed to pull together information from the large number of public and private sector organisations, in particular water companies, who hold this information and ensure that it serves as a basis for positive, forward-looking action.

2.5. Questions/Answers Session:

Some of the main remarks from this session are summarised as follows:

- How to engage the public remains a big challenge in flood risk management, improvements in this direction would be of great use.
- Local authorities commented on the current lack of resources, which constitutes one of the main challenges they are facing. Increasing taxes could be an alternative to improving this.
- The results of the RainGain project could help in better targeting investments at the Local Government level.
- From the local authorities' point of view, surface flood warnings, even with 30 min lead time could be useful. For example, with 30 min lead time traffic could be re-directed, tube stations could be closed, temporal changes in the control elements of the sewer system could be made (e.g. pumping, storage), amongst others.
- Improved communication of flood risk (better display and visualisation of results) is a recurrent need. Information on different sources/types should be integrated into databases and improved GIS tools should be developed for better displaying it and for providing more complete information to the general public.

3. Presentations - Guest Speakers

Presentations were given by two guest speakers:

- Stephen Merrett (Warning and Informing Senior Advisor, Environment Agency)
- Louise Clancy (Climate Change Adaptation and Water Programme Officer, Greater London Authority)

The presentations were followed by questions/answers session**. These presentations will be circulated** amongst attendees; however, a brief summary of the main points of each of the presentations is next provided.

3.1. Presentation by Stephen Merrett (Environment Agency): Exercise Watermark

- Stephen provided an overview of the Exercise Watermark, Britain's biggest ever civil emergency exercise, designed to test the country's response to floods.
- This exercise took place in March 2011 and tested the response to all kinds of flooding (pluvial, fluvial, coastal, reservoir failure).
- This exercise was undertaken in response to the recommendations made in the Pitt Review of the 2007 summer floods.
- Managed by Defra, supported by the Welsh Government and delivered through the Environment Agency, Exercise Watermark set out to test how new arrangements would cope with a severe flood scenario in England and Wales. These arrangements included the National Flood Rescue Arrangements (NFRA), Multi-Agency Flood Plans (MAFP), new flood warning codes and elements of the Flood Forecasting Centre (FFC), along with other initiatives implemented since 2007.
- Some of the main successes and lessons learned from this exercise include:
  - Learning how to deal with huge amounts of information
  - During the exercise, even though resources were stretched to the limit, things worked well
  - Need for improving flood visualisation abilities
  - Data must be prepared now, so we have it ready for an incident
  - Need for better use of technology for information sharing and reporting data (data sharing and reporting should be automated as much as possible)
  - Need to continue to promote flood risk awareness to individuals and communities
- With regard to pluvial flooding, Stephen mentioned some key recommendations:
  - Need to establish clear roles and responsibilities (for the different agencies and authorities involved in it)
  - Have clear media statement, to share information with the community
  - Further investigate the use of pluvial flood warnings, improve IT.

3.2. Presentation by Louise Clancy (Greater London Authority, GLA): Helping Londoners to prepare for flooding

- Louise provided an overview of what the GLA is doing regarding surface water flooding in London.
- Londoners need an effective warning system for surface water flooding, which is reliable, easy to understand, maximises response time, is affordable, integrates all sources of flood risk, is easy to sign up / communicate
- In early 2007, surface water floods were identified as a potential threat, but London was not prepared for it (there was no ownership of risk, no map of where it might get wet, fragmented responsibility for delivery, low skills base outside consultancies).
- Additional challenge: 33 boroughs, therefore 33 ways of working
- After the summer floods 2007 (responsible for £3bn insured losses), the government commissioned the 'Pitt Review' and the new Flood and Water Management Act was issued.
- Following these events, the Drain London Project (managed by the GLA) was launched in 2010. Its purpose is to help manage and reduce surface water flood risk in London by improving our knowledge of the surface water drainage system and identifying areas at greatest risk of

flooding. As part of this project, the following activities are being developed: map surface water flood risk across London, identify 'critical drainage areas', develop surface water management plans for each London Borough, undertake actual flood risk mitigation projects

- So far, all London Boroughs have a draft Surface Water Management Plan.
- In addition, the GLA is developing pilot Community Flood Plans in collaboration with local community members. These plans contain simple information (straight to the point!) about the sources of flooding in a given area, how to prepare for, and how to better deal with it.
- In addition, the GLA is leading two pilot projects about green roofs, which are expected to reduce runoff and therefore contribute to reducing surface flooding, while providing additional benefits.
- Links with the RainGain project: the GLA will help transfer project results to local governments

3.3. Questions/Answers Session:

Some of the main remarks from this session are summarised as follows:

- Once again, communication was highlighted as a key aspect and remaining challenge. If results and warnings are not communicated effectively, the resources invested in modelling and forecasting will have been wasted. One option which has proven effective for communicating flood risk is replaying videos of flood simulations.
- Richard Allit highlighted the need to listen to the public in order to better understand flooding mechanisms.
- Forecast reliability was also identified as a key issue. Estimation and communication of reliability/uncertainty must be improved before forecasting results can be used operationally.
- A balance must be achieved in the amount of information that is provided to the public and its reliability. According to Stephen Merrett (Environment Agency), people prefer to have information, even if it is not 100 % certain. In addition, he pointed out that giving early information has proven to increase preparedness and is well received by the public.
- Communication of flood maps is a complex matter, as it entails issues with insurance premiums and property values.
- Public engagement remains a key challenge in the UK. According to Stephen Merrett (Environment Agency), local engagement (at the local community level) seems to produce better results; consequently, the approach is changing from national campaigns to local community level ones.
- A clear and "unified" understanding of "surface water flooding" must be developed. At the moment, surface flooding is sometimes treated separately from sewer flooding. However, these types of flooding are part of the same phenomenon and they should be dealt with in an integrated manner.

4. Breakout Session

The audience was split into 3 groups, each of which discussed one of the following 3 topics:

i. rainfall as an input for urban pluvial flood modelling and forecasting (chaired by Malcolm Kitchen, UK Met Office)

ii. hydrological/hydraulic models for urban pluvial flooding and forecasting (chaired by Cedo Maksimovic, Imperial College London)

iii. improved management of urban pluvial flooding (chaired by Laurie Thraves, Local Government Flood Forum)

5. Conclusions from breakout session

The chairs of each breakout group presented a summary of the main conclusions derived from the group discussion. **A summary for each session is provided in separate files**.

Key conclusions were:

- Engagement of the public must be increased. Provision of information on property level flood risk by local government can help drive interest in flooding resilience measures. However, there is a need for local government to provide clear next steps for the residents concerned. Councils will need to play a leading role in the development and co-ordination of community flood plans. Harnessing the power of new technologies could be an important aspect of this.
- With regard to rainfall requirements, improved accuracy of rainfall forecasts was ranked as the main challenge that must be overcome before we can have effective urban pluvial flood forecasting. Improved data accuracy could be attained by merging rainfall estimates from different sensors (mainly raingauges and radars). Improved rainfall resolution is also a need, but rainfall data users consider accuracy to be more important than resolution.
- Regarding hydrological and hydraulic models of urban pluvial flooding, some of the most critical challenges include reduction of runtimes, while keeping reasonable accuracy, and overall estimation and management of the uncertainty associated with the forecast.

6. Closing

Closing by Laurie Thraves

Laurie concluded by thanking WSP for their on-going and generous support and details on how to get involved. Please contact Laurie Thraves on 020 7445 2845 and laurie.thraves@lgiu.org.uk or Susana Ochoa-Rodriguez on s.ochoa-rodriguez@imperial.ac.uk.