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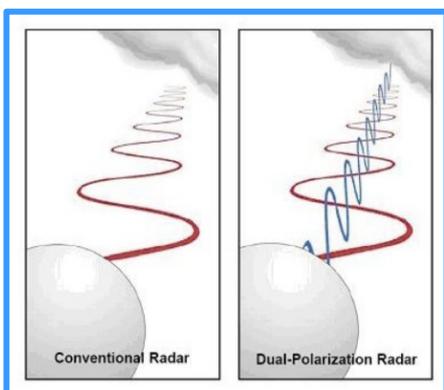
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## RainGain recent outcomes



### The review document « Methods and experiences in radar based rainfall estimation » is now online

One of the goals of the RainGain project is to obtain fine scale rainfall estimates that are based



Working principle of a conventional (single, horizontal polarization) radar versus a dual polarization (horizontal and vertical) radar (Source: NOAA).

on radar data and are relevant for rainfall and flooding forecasts in urban areas. Up to now, two **scientific workshops** have been organised by the Belgian partners (KU Leuven and Aquafin) with the purpose of establishing an interface between the demands of the flood modellers and forecasters and the possibilities of the radar meteorologists to deliver fine-scale rainfall estimates. The review document “Methods and experiences in radar based rainfall estimation”, edited by KU Leuven, is one of the outcomes of the last meeting: the International RainGain workshop on “Fine scale rainfall estimation”, held on 16<sup>th</sup> April 2012 in Leuven.

With a focus on the use of fine-scale rainfall data for urban hydrological applications, this document aims to bridge the gap between the expertise fields of radar meteorology and urban hydrology, drainage and flood

management and control. The review document will not stay frozen but will be a **lively document** that will be extended with practical examples from the RainGain project outcomes as we go along. Everybody is welcome to send comments and/or suggestions (examples of good practical, important additional references, ...) for inclusion in future versions of the document. Towards the end of the RainGain project, more concrete outcomes and experiences from the different pilot cases of the project will be added. The review document is available on [www.raingain.eu](http://www.raingain.eu). For further information and contributions to the review document: [Patrick.Willems@bwk.kuleuven.be](mailto:Patrick.Willems@bwk.kuleuven.be)



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## The Meteor 60DX radar is ready to travel to Paris

From the 21<sup>th</sup> to the 23<sup>rd</sup> of May, a **factory test** of the future French radar was performed by the ENPC team, with the assistance of **Prof. V. Chandrasekar** (CSU Fort-Collins, CO, USA and CASA Deputy Director for Research) in Neuss, Germany.

The aim of the test was to map the radar specification features and to evaluate if they are useful for highly accurate observation of rainfall distribution in space and time. The test was successful: some final improvements will be made by Selex, the radar manufacturer, but there won't be delays in the delivery schedule.

Two weeks later, on the 5<sup>th</sup> of June, another important meeting concerning the future French X-band radar took place in Paris-Est Campus : a **consultation meeting with the CHSCT** of UPEM (University Paris-Est Marne-la-Vallée), one of the five commissions representing the users of the building where the radar will be installed. Several questions raised among the participants, mostly about the innovations brought by the RainGain project but also about the radar frequencies impact on workers' health.

**Daniel Schertzer** (École des Ponts Paristech) illustrated what is the intensity of X-band radar frequencies and that these frequencies won't directly hit any building because of the location of the device (10 meters above the roof of Bienvenue building). Furthermore, he highlighted that controls will be performed to make sure that security regulation is respected. The meeting concluded with a vote: all participants expressed their support for the project, except for a member who abstained from voting.



## Update of three new weather stations in Rotterdam



In the morning of the 5<sup>th</sup> of May 2014, the internal systems of three small weather stations in the area of **Rotterdam** were updated. In order to do so, the software needed to be installed and tested on site. At the same time the maintenance of the measuring devices of the weather station was done. **Robbert Eggermont** and **Ruud de Jong**, both working at the faculty **Electrical Engineering, Mathematics and Computer Science** of **TU Delft**, performed this maintenance and updates.

In total, there are 14 weather stations located in the area of Rotterdam. Eight of them have been updated with the newest communication software. The old communication software worked with GSM signals, and the new software is working with GPRS. The change of the software leads to a change in data collection process. With the old system, the data server needed to connect to the weather stations to collect the data, and was collected once a day. Now, with the GPRS system, the data is sent automatically to the data server every 5 minutes. Thanks to this system, we have direct access to the data in real-time. In addition, this system can detect sensor errors very quickly. The new software will be installed on the other six stations in the near future.

These stations will make it possible to **validate the high-resolution rainfall** radar that will be installed in the following months on one of the highest buildings in Rotterdam.

This radar will provide rainfall observations at a scale of 30x30 square meters, and better previsions of the urban floods in the Rotterdam area.

## RainGain scientific communications

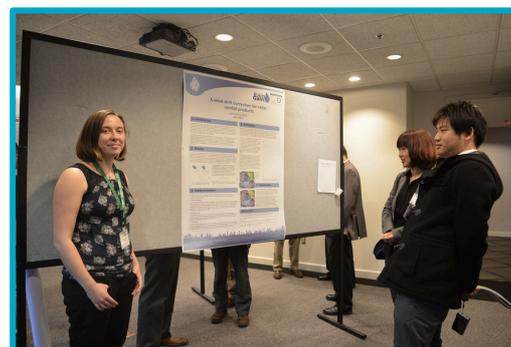


### WRaH 2014 : RainGain partners present a study on weather radar for urban hydrology in North-Western Europe

From the 7<sup>th</sup> to the 10<sup>th</sup> of April, the **Weather Radar and Hydrology conference** was organized in Washington DC. The conference included two sessions on Weather Radar Applications in Urban Areas, an emerging topic at the conference. Speakers of the RainGain team contributed to both sessions with presentations on radar rainfall data merging, high resolution rainfall forecasting, fractal analysis.

A **joint study** was presented on the same occasion. The research work investigates the impact of rainfall estimates of different spatial resolutions on the hydraulic outputs of the models of four of the EU RainGain project's pilot locations. The present study will soon be extended to more storms as well as model structures and resolutions, with the final aim of identifying critical spatial-temporal resolutions for urban catchment modelling in relation to catchment and storm event characteristics. The full paper is available in the "Conferences with proceedings" section on [www.raingain.eu](http://www.raingain.eu).

Other presentations at WraH 2014 included the Dallas-Fortworth Demonstration network, multi-sensor rainfall observation systems and progress on rainfall forecasting for convective storms. The symposium program included short courses on radar rainfall estimation and gridded data for hydrological modelling and a special lecture on rainfall derived from polarimetric radar. The program concluded with a lively panel discussion on the future of quantitative precipitation estimate and forecast and hydrologic flood forecasting. High-resolution estimates and forecasts for urban applications came out as one of the important topics for future research and development. We will no doubt see a lot of innovations in this field at the next symposium on Weather Radar and Hydrology that will be organised in 2017 in Malaysia.



Katie Norman from the MET Office presenting a poster on « A wind drift correction for radar rainfall products » (source : WRaH2014).



### New session at EGU 2014: Precipitation and urban hydrology

The RainGain team initiated a new session at the European Geoscience Union General Assembly (Wien, 28 April - 2 May 2014), on the topic of **precipitation measurement and hydrological modelling in cities**.

Several examples were presented of **X-band radars applied in cities**: in Central Italy, Hamburg and in the Dallas-Fortworth metroplex in the US. The presentations made clear that there is a trade-off between quality and costs: cheaper radars are typically used in combination with national C-band radar networks, while more advanced radars provide independent and more accurate measurements.

These presentations were followed by demonstrations of **applications of high-resolution rainfall data in urban hydrological models**. The audience was impressed by the powerful visualisation and computing capabilities of the 3Di model. In the two presentations related to RainGain pilot sites, one demonstrated sensitivity of urban hydrological models to precipitation variability, while the other showed, in a comparison of four pilot sites, how different catchment characteristics lead to really different responses of the hydrological systems.

Later that day, poster summaries and discussion were organised for the same session. Three topics were discussed: the potential of rainfall retrieval from GSM antenna links in cities, rainfall data retrieval and simulation based on merged radar and rain gauges data sources and hydrological response in cities as a result of ongoing urbanisation and in relation to the spatial resolution of precipitation data.



## Last events



### Three days in the Paris Region: from science to « edutainment »

On the 27<sup>th</sup> of June, RainGain researchers gathered together at École des Ponts ParisTech for a **scientific workshop**. After a tutorial, they used fractal tools to analyse the features (sewer network, distribution of impervious areas) of various catchments of the RainGain pilots. The workshop was aimed to test how this tools help to interpret the results of the comparison of the simulated flow. Rain gauges networks were also analysed. Lastly, progress and plans with regards to RainGain work packages and paper were discussed.

The following weekend, some of the researchers got involved in the **RainGain itinerant laboratory**. Indeed, Festival de l'Oh ! hosted for the second year a stand dedicated to the project.



Festival de l'Oh! takes place every summer along the Seine and Marne rivers to raise awareness on water issues among the large public. The RainGain researchers together with the "Crazy Scientists" enriched these two days of shows, exhibitions and sports with educational entertainment for adults and children. The festival was also an opportunity to meet local government representatives who visited the RainGain stand on Sunday afternoon: **Christian Favier**, President of the General Council du Val-de-Marne (CG94), **Didier Guillaume**, Mayor of Choisy-le-Roi and General Counsellor for Choisy-le-Roi at CG94, **Pierre Gosnat**, Mayor of Ivry-sur-Seine, and **Pascal Salvoldelli**, General Counsellor for Ivry-sur-Seine at CG94.

## Save the date



### 6-7<sup>th</sup> October 2014 : RainGain 6<sup>th</sup> project meeting in Exeter (UK)

UK partners will host the next project meeting. The RainGain consortium will meet at the MET Office facilities for an update on work packages and pilot sites, as well as to plan future developments. The detailed agenda and registration form will be available on [www.raingain.eu](http://www.raingain.eu).



### 8<sup>th</sup> October 2014 : RainGain 2<sup>nd</sup> Local Authorities Meeting in London

The aim of the meeting is to build upon the Conference at MACVAL (Vitry-sur-Seine) and develop the engagement of local government with the RainGain project by discussing policy, strategies and solutions for urban flood control based on detailed radar-rainfall data. The first part will be a 'Policy Discussion' in the Houses of Parliament where LGIU will present the findings of their research on the governance of flooding. This Policy Discussion will be aimed at elected members with responsibility for flooding, climate change adaptation and resilience. The second part will be a 'Conference' that will bring together the RainGain researchers, flooding experts and officers from local government. The Conference will explore two main themes: what type of radar installation is appropriate for Local Authorities and how will the findings from RainGain affect disaster planning and resilience policy? Further details on the program and registrations will follow on [www.raingain.eu](http://www.raingain.eu).