



swimming pool or up the Zurich Berg with a train is just more fun with two ecstatic sons.

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CASA-RainGain Urban Flash Flood Workshop 27-28 June 2013, Arlington, Texas

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Last June I visited the University of Texas at Arlington to meet representatives of the CASA project in the US (CASA: Collaborative, Adaptive Sensing of the Atmosphere). CASA is deploying a network of Xband radars in the Dallas Fortworth (DFW) area to track severe rain storms hitting the metroplex and causing serious flash flooding. In Europe, we are undertaking similar activities in the RainGain project, where Xband radars are installed in Leuven, London, Paris and Rotterdam for high resolution rainfall measurement and flood prediction.

Arlington in June is a hard place to imagine floods: it is as dry and as hot as a desert. It is also a drive-only city:

first place I have ever visited without any form of public transport and sidewalks are nearly non-existent. Asphalt and bricks, on the contrary, are everywhere. Still, the city has a spacious feeling; more space to store stormwater than we have in most of our densely built European cities.

CASA and RainGain decided to have a 2-day workshop here to share experiences and see how we could cooperate and learn from one another. The workshop was truly multi-disciplinary: we had representatives from universities, national weather service, corps of engineers, local engineering firms, regional authorities and cities in the DFW metroplex. We discussed topics ranging from radar system configurations to hydrological modeling, user needs and public participation. All participants contributed by short presentations, adding to a lively discussion on the various topics.

The DFW area receives 500 to 1200 mm of rain per year, similar to NW-Europe, but rainfall intensities for short time periods of 10 to 60 minutes are about twice as high (for instance: $T=10$ yrs rainfall intensity for 15 minutes is 169 mm/h compared to 72 mm/h in the Netherlands¹). This is due to the DFW area's proximity to the Gulf of Mexico, where tropical storm systems can be generated above the warm sea waters. Hence their preference for installing a network of radars, to allow close tracking of storms. In RainGain single X-band radars have been installed, but in the future networks of radars could be envisaged for better storm tracking and so one radar can fill in for another when a signal is attenuated by intense rain.

On the other hand, DFW has a lower degree of imperviousness compared to the more densely built cities in RainGain, so flood peaks are more smoothed. And a large part of the stormwater drainage system consists of above-ground channels and, while many areas in the RainGain participating cities are largely equipped with piped and culverted systems, due to limited available open space. At the same time, urbanisation and further densification is a growing concern in DFW, since this is the fastest growing region in the US, expected to grow from 6.5 million to 13 million inhabitants in the next 10 years. Citizens have already expressed their concerns about increased flooding as a result of this process.

¹ IDF curves for Texas: http://www.utdallas.edu/~brikowi/Teaching/Applied_Modeling/SurfaceWater/LectureNotes/Rainfall/Texas_Rainfall_IDF.html

IDF curves for the Netherlands: Buishand en Wijngaard, 2007.

The participants shared some interesting first results on hydrological modeling approaches, especially how to balance detailed modeling to take full benefit of high resolution rainfall data with the requirement of short computational required for real-time applications. Another important topic was the use of extreme rainfall alerts and flash flood warnings: existing products apply to large scales, typically river basins rather than urban areas, and this tends to result in a lot of over-warning. It was generally agreed that improvement is needed by integrating more detailed observations into warning products: more detailed rainfall data in time and space, higher accuracy and reliability and preferably also include more and detailed information on expected impacts.

The workshop presentations and discussions demonstrated that there is a lot of information and insights to share between the CASA and RainGain projects. Once the radar network in DFW and the radars in RainGain are all fully operational, new and exciting results will provide every reason to organize another joint event.



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