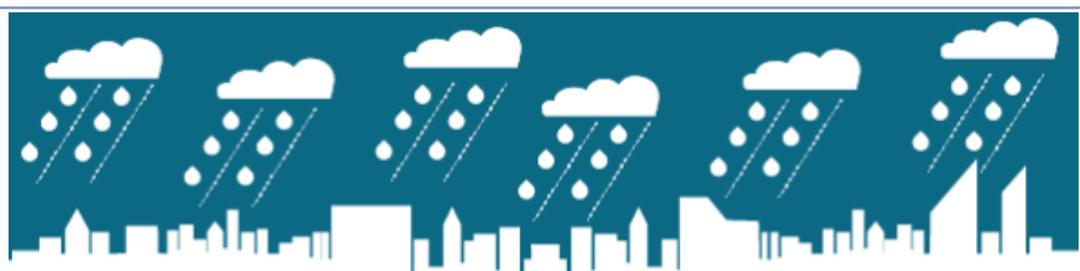# MUFFIN - MULTI-SCALE URBAN FLOOD FORECASTING

NEWSLETTER 3 (April 2019)

The MUFFIN project is now in its final stage. The outcome of the project will be presented at a conference in Malmö 13-14 June 2019 together with presentations of three other projects on the same theme.

International conference

CITIES, RAIN AND RISK

In 2014 Malmö City was badly flooded, and the urban flooding hazard is generally expected to increase from now on. This may happen both because of global warming, leading to more intense rainfall, and increasing urbanization, making cities more vulnerable, or a combination of the two. There are thus very good reasons to develop methods, tools and measures to improve our preparedness and make our cities more "climate-proof".

At the conference, results from four research projects will be presented, divided into the following themes:
- End-user engagement, tailored tools and public perceptions
- Rainfall and environmental observation and forecasting
- Urban flood modelling and forecasting
- Water management, nature-based solutions and climate adaptation

The four research projects are: MUFFIN, INXCES, SURF and Weather Radar project.

Research, innovation and implementation
The conference addresses both practitioners and experts dealing with urban flooding hazards in some way, as well as academics and scientists in the field. This will include two days with both evidence from research and discussions on how we apply the research in our everyday lives.

Before the conference, a so-called City Climate Cafe will be organized by INXCES in Malmö on 10-12 June.

Here is a more detailed program. We look forward to seeing in you in Malmö in June!

MUFFIN - MULTI-SCALE URBAN FLOOD FORECASTING

Three joint experiments are performed. Here are some preliminary results from joint experiment 1 and 2, which are almost finished.

EXPERIMENT 1- URBAN FLOOD RISK ASSESSMENT: HIGH-RESOLUTION HYDROLOGY VS. HYDRAULICS

Objective

Evaluate the correspondence between urban flood risk as estimated by a high-resolution hydrological model (HYPE) and a hydraulic model (MIKE), respectively. Hopefully, this will give an increased spatial and temporal resolution and can be useful for urban flood simulation and forecasting.

Method

Aalborg and Helsinki are the two study locations. HYPE models have been set up for each city and compared with the hydraulic model SWMM in Helsinki and MIKE in Aalborg. All models have been driven with a common forcing data set with 95 selected events from the period 1979-2017.

Results

There is a good correspondence between the dynamics for runoff estimated by HYPE and SWMM/MIKE, regardless of the different temporal resolutions. The runoff volumes in HYPE are very similar to SWMM but not as similar to MIKE (Figur 1). This is probably due to the lower quality of the calibration data in the Aalborg case.
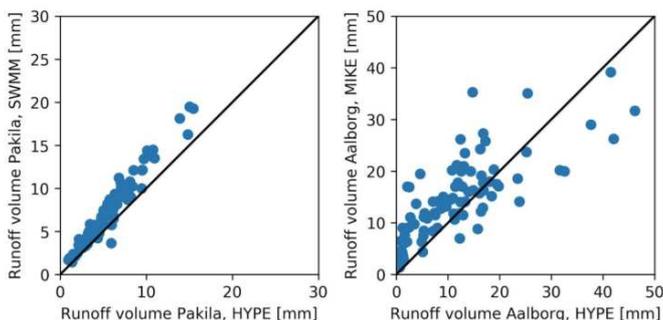

Figure 1 SWMM/HYPE and MIKE/HYPE runoff volumes for the simulated events

However, despite the correlation between SWMM/MIKE and HYPE runoff, preliminary results indicate that there is no clear added value in using HYPE runoff for flood risk assessment, as compared with using rainfall directly.

EXPERIMENT 2- MULTI-SCALE ASSESSMENT OF HEAVY RAINFALL IN RADAR OBSERVATIONS

Objective

The correspondence between radar and rain gauges in periods of heavy rain as a function of temporal resolution has been evaluated. Are there any differences between countries or scales?

Method

Radar data and rain gauge data of the top 50 rainfall events in each country (Netherlands, Denmark, Finland and Sweden) have been compared.

Results

There are disagreements between radar vs gauges. The radar underestimate peak intensity compared to the gauge. There is a large difference between the countries (Figur 2). All countries show that the shorter rain the greater ratio between radar vs gauges.
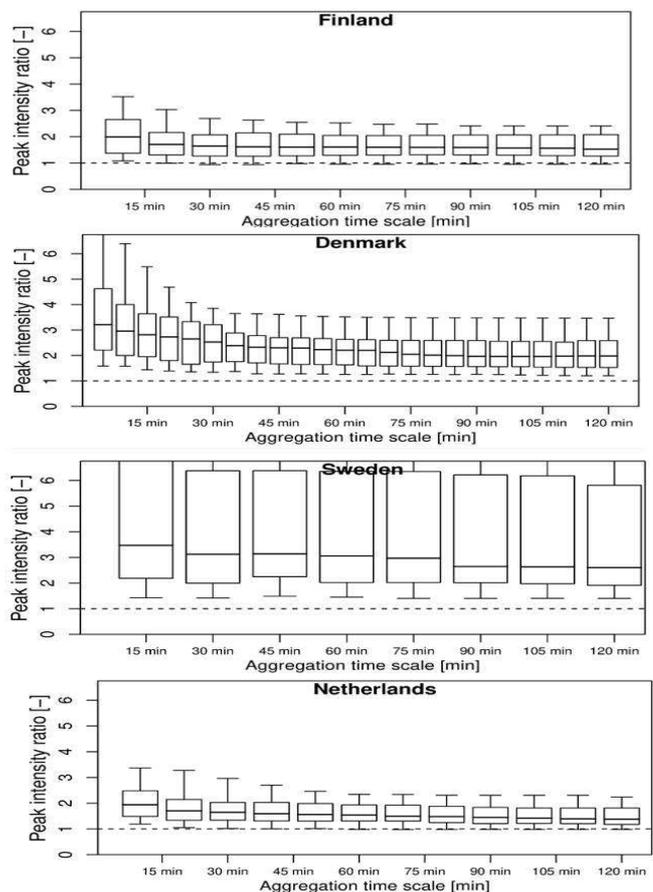

Figure 2 Ratio between the radar vs gauge data in Denmark, Finland , Sweden and Netherlands. Duration up to two hours.