



International conference

CITIES, RAIN AND RISK

ABSTRACT BOOKLET

4 projects - 4 themes – 22 abstracts



LUND UNIVERSITY



NTNU

SMHI

VASYO 



MUFEN



Water
JPI 



Svenskt Vatten

APPETIZER

Flood and heatstress models and the need for (sub-) surface INnovations for eXtreme Climatic Events (INXCES)

*F. Boogaard*¹⁺²

¹ Hanze University of Applied Science, Groningen, The Netherlands

² Global Center on Adaptation, Energy Academy Europe, Groningen, The Netherlands

Email: floris@noorderruimte.nl

The INXCES Project

Urban flooding and heatstress have become a key issue for many cities around the world. The project 'INnovations for eXtreme Climatic Events' (INXCES) developed new innovative technological methods for risk assessment and mitigation of extreme hydroclimatic events and optimization of urban water-dependent ecosystem services at the catchment level. DEMs (digital elevation maps) have been used for more than a decade now as quick scan models to indicate locations that are vulnerable to urban flooding. In the last years the datasets are getting bigger and multidisciplinary stakeholders are becoming more demanding and require faster and more visual results. In this paper, the development and practical use of DEMs is exemplified by the case study of Bergen (Norway), where flood modelling using DEM is carried out in 2017 and in 2009. We can observe that the technology behind tools using DEMs is becoming more common and improved, both with a higher accuracy and a higher resolution. Visualization tools are developed to raise awareness and understanding among different stakeholders in Bergen and around the world. We can conclude that the evolution of DEMs is successful in handling bigger datasets and better (3D) visualization of results with a higher accuracy and a higher resolution. With flood maps the flow patterns of stormwater are analysed and locations are selected to implement (sub-)surface measures as SuDS (Sustainable Urban Drainage systems) that store and infiltrate stormwater. In the casestudy Bergen the following (sub-)surface SuDS have been recently implemented with the insights of DEMs: settlement storage tank, rainwater garden, swales, permeable pavement and I/T-drainage. The research results from the case study Bergen will be shared by tools to stimulate international knowledge exchange. New improved DEMs and connected (visualization) tools will continue to play an important role in (sub-)surface flood management and climate resilient urban planning strategies around the world.

Next to flood modelling heatstress maps have been created within the INXCES project for Groningen and Bucharest (figure 1c). The map illustrates points in the city that will have a high temperature and PET (physical equivalent temperature) in the current climate and possible increase of temperature of 1 or 2 C due to climate change. The calibration of the map and interaction with stakeholders was the subject of 25th edition of the Wetskills Water Challenge in Romania where a Romanian-Dutch team of young water professionals won this challenge creating the idea of a heat stressmap app for the city of Bucharest. The app will show inhabitants and stakeholders where extreme heat can occur in cities on very hot days and where you can take measures with a link to www.climatescan.nl. The team recorded the effects based on data from local participants and interviews. The team designed a smart phone app that charts both problem locations and possible solutions to stimulate climate adaptation in Bucharest. The jury assessed the winning team as follows: "We chose a team with a market ready, feasible and flexible solution. Due to climate change,

extreme weather events are becoming more frequent. For Bucharest this has consequences such as heat stress and flooding.



Fig. 1 Floodmodel Bergen, Norway in 2009 (left) and 2017 (right). Heatstress Bucharest Romania (right).

Acknowledgements: This study would not have been possible without funding from JPI Water funded project INXCES.

References

Boogaard F., Kluck J, Schoof G, Bosscher M., The need for INnovations for eXtreme Climatic Events (INXCES), the progress of flood modeling case Bergen Norway, Procedia Engineering Volume 209, 2017, Pages 56–60, <https://doi.org/10.1016/j.proeng.2017.11.130>, Elsevier 2017

<https://www.dutchwatersector.com/news-events/news/25667-heat-stress-city-app-wins-romania-wetskills-water-challenge.html>