

GREENSTORM

DESIGN AND DEPLOYMENT OF
STORMWATER NATURE-BASED
SOLUTIONS (NBS) FOR A RESILIENT AND
LIVABLE CITY 2024-2026

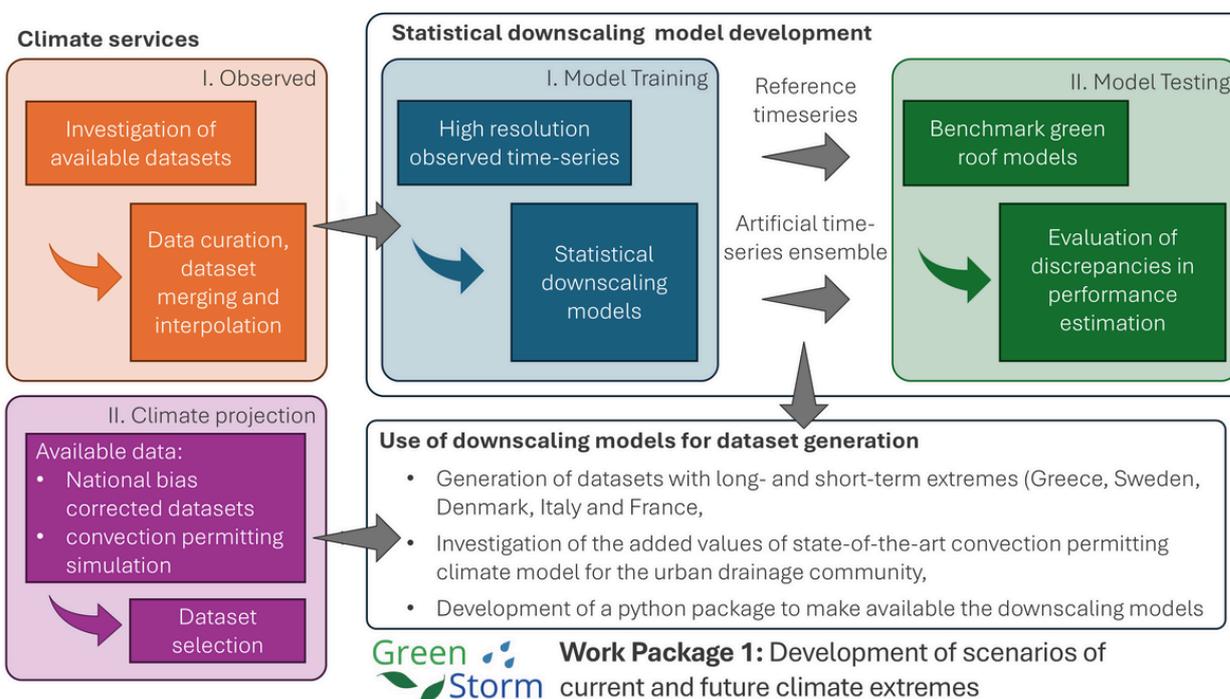


PROJECT PROGRESS

Climate data sets available!

After a bit over a year, the first GreenStorm work package is almost complete. The objective was to produce datasets representing future climate conditions, at a timescale suitable for stormwater simulations. This has been achieved by further work on existing methods for downscaling of outputs from climate models (e.g. at 24 hour resolution) using statistical disaggregation to produce timeseries at a few minutes resolution.

The disaggregation takes into account temperature data, which allows including changes in precipitation pattern induced by temperature distribution shift in future climate scenarios. This method has now been tested for each of the five GreenStorm case study locations (Paris, Genoa, Athens, Copenhagen, and Östersund) using local observations of rainfall and temperature and outputs from climate models.



The main challenge in producing those datasets lies in the heterogeneity in available datasets for training, as well as in climate services available for obtaining state-of-the-art climate projections as inputs.

The work is now in the final stages and the downscaling code will be published soon in peer reviewed journal article. A work focused on the added value of convection permitting climate models for urban drainage will be presented at the Urban Drainage Conference. After conclusion of the work package, the produced timeseries can be easily updated as needed for other GreenStorm activities on modelling nature-based solutions and catchment-scale stormwater management.



FOCUS

Experiments under controlled climate within Sense City

In September 2024, climate chamber experiments were conducted within the Sense-City facility in Champs-sur-Marne (France) to better understand the hydrological and thermal performance of Stormwater Nature-Based Solutions (NBS_{SW}) as well as the physiological response of the vegetation during climate extremes.

The Sense-City facility, a unique equipment in France, consists of mobile climate chamber covering a 400m² mini-city including two types NBS_{SW}: stormwater trees and a rain garden. The September campaign focused on heatwaves conditions, with the application of 4-days cycle with temperatures (and relative humidity, RH) varying from 21°C (RH = 80%) at night to 37°C (RH = 40%) at maximum daily temperature period (reached during about 2 hours in the middle of the afternoon).



Monitoring stormtrees and raingarden inside the SenseCity climatic chamber



This scenario represents a quite extreme situation for current climate, but should become far less unusual in future climate conditions (based on projections for 2050), making it relevant to study the performance and resilience of NBS_{SW} for future climate extremes.

The observations collected during the experiment include leaf-scale physiological measurement, along with continuous monitoring of soil moisture content, tree transpiration and microclimate conditions. While the analysis of the results is still underway, NBS_{SW} overall showed good resistance to the applied conditions, with limited modifications of plant physiology.

Further investigations will be dedicated to in-depth analysis of the different monitored variables, but also clarifying the repetitiveness of the experiment. A second round of climate simulations will be performed this June to consolidate and expand the analysis.

Leaf-scale physiological measurement



EVENTS

Co-creation workshops in Paris - How can the City of Paris better integrate nature-based stormwater management into its climate adaptation strategies?

NBSsw should not only be designed to be technically efficient and resilient to climate extreme conditions, but they need to meet the constraints of urban technical services and the expectations of local residents. This challenge is address within GreenStorm through a series of co-creation workshop between researchers and partner cities.

During the first workshop held in Paris in January 2025, we examined current street-greening systems and their effectiveness in water balance simulations, we discussed opportunities to scale up similar stormwater management solutions from the neighborhood to city level and finally we discussed integrating street greening with broader climate adaptation strategies. The redevelopment project of rue de La Jonquière in Paris served as a case study. Opportunities and limits offered by the intended NBSsw design were discussed based of hydrological modeling results, with a focus on water availability for plants during drought periods.

Another co-creation workshop will be held with the municipally of Athens in June, addressing challenges linked to heat wave management drought and NBSsw deployment in Mediterranean context.

Participants of the Paris co-creation workshop



NEWS

GreenStorm was represented at the EGU conference in Vienna in May, and will be presented at UDM in September.

Two postdocs have joined the project since last autumn: Ahmeda Ouedraogo (Cerema) on NBSsw modelling, Yao Li (Leesu) on data collection and SenseCity experiments.

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