



## Integrated urban climate studies – first experiences and results from the interdisciplinary project inteGREEN

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As extreme heat events are becoming more frequent and more intense in the context of climate change, it is a major objective to mitigate urban overheating through strategic urban planning and design. For example, the introduction and expansion of vegetation in urban settings is often considered a very promising means to reduce heat stress, and even more generally improve quality of life in cities as it is widely associated with better human health and well-being, flood risk management and biodiversity. However, also unwanted effects may occur, e.g. with respect to water demand, or social injustice. The specific design, placement, and management of greening solutions in the context of the complex urban environment highly determine the “success” of a given intervention.

In practice, it is still challenging to implement solutions that fundamentally mitigate heat risk in urban settings while enhancing a city's resilience. This is in part explained by the complexity and variability of natural and anthropogenic processes in the urban environment, but also by the insufficient integration of urban climate sciences at multiple levels – be it

- within the discipline itself (e.g. linking near-surface micro-climate conditions with synoptic-scale atmosphere dynamics)
- with other natural science disciplines (e.g. soil sciences, plant ecophysiology, ...)
- with social and political sciences, ...

- or with those who are in fact responsible for implementing solutions on the ground (e.g. urban planners, architects, services of local authorities, etc).

To ensure urban climate science will play a more active role in informing the rapid urban transitions that take place around the globe, all these components need to be connected more effectively through improved knowledge exchange and careful co-construction.

To address this need, interdisciplinary initiatives are developing in many cities and regions. Here we present first experiences and results from the interdisciplinary project *JbhY; F99B* (funded through the French Priority Research programme for Sustainable Cities -- PEPR VDBI) and the recent ANR project H2C. inteGREEN is developing a more integrated view on the topic of vegetation in urban settings. Firstly, we describe how extreme heat hazards form in Paris and which influence can be attributed to the urban environment and the larger-scale weather circulations, respectively. Then we discuss how different types of vegetation can be used to reduce heat hazards under certain conditions (e.g. at night, during day). Finally, these ecosystem services are put into the larger context by e.g. incorporating considerations of soil and plant health in urban settings. We conclude with some experiences regarding the aspects of knowledge exchange and co-construction with diverse stakeholders in the Paris region.