

DESTINATION EARTH

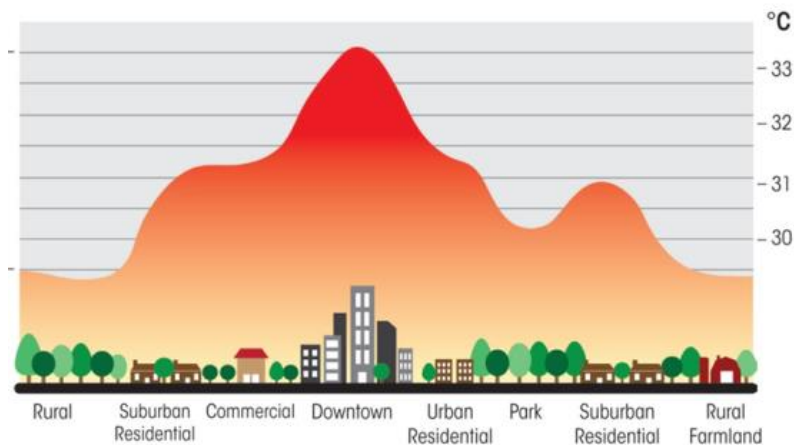
URBAN HEAT USE CASE OVERVIEW

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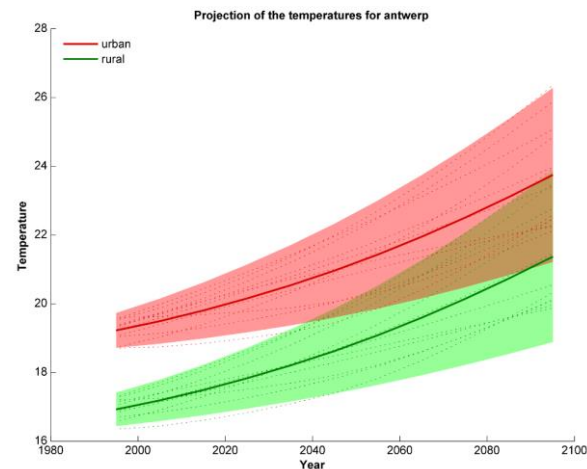
Urban Heat: Introduction

Background

- Climate change leads to increasingly frequent and intense heatwaves in Europe
- Cities are especially at risk because of the urban heat island (UHI) phenomenon



Late afternoon air temperatures across a city. Source: [web](#)



Projected average summer air temperatures [°C] for the city of Antwerp under the RCP8.5 climate scenario. Source: VITO.

Urban Heat: Overview

Motivation

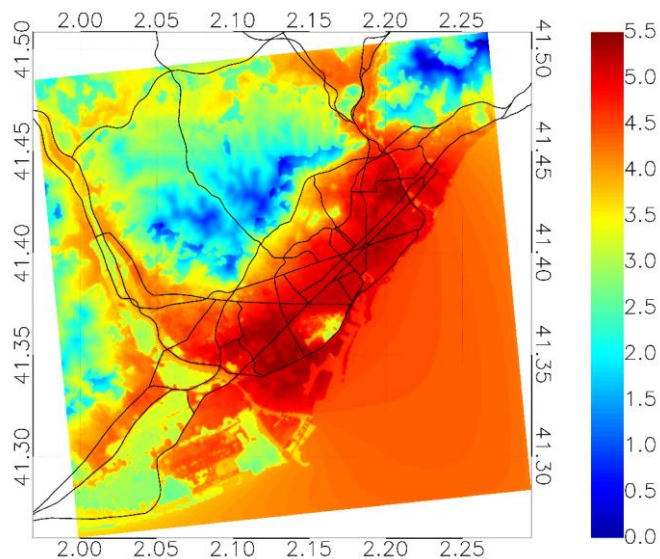
- Support EU adaptation policy intended to **increase urban resilience** against projected exposure to extreme heat

Objective

- **High-resolution urban heat maps** for cities across Europe to underpin and motivate urban climate adaptation measures that are being developed

Users involved

- Main users:
 - DG Regio, demonstration cities Prague and Lisbon
- Other stakeholders:
 - Relevant DGs: Clima, Environment, ...
 - European Institutes: JRC, EEA, OECD, WB, ...
 - City networks: ICLEI, EuroCities, Covenant of Mayors, Climate Alliance, ...



Example output map of VITO's UrbClim model, showing the average Urban Heat Island intensity of the city of Barcelona (Spain) during the summer months. Source: VITO.

Co-development of the use case

- Through interactions and workshops with our main users (DG Regio and 2 demonstration cities) and other stakeholders, the final scope and technical requirements of the use case will be defined (e.g. indicators, type of scenarios, time horizons, ...)

Expected output

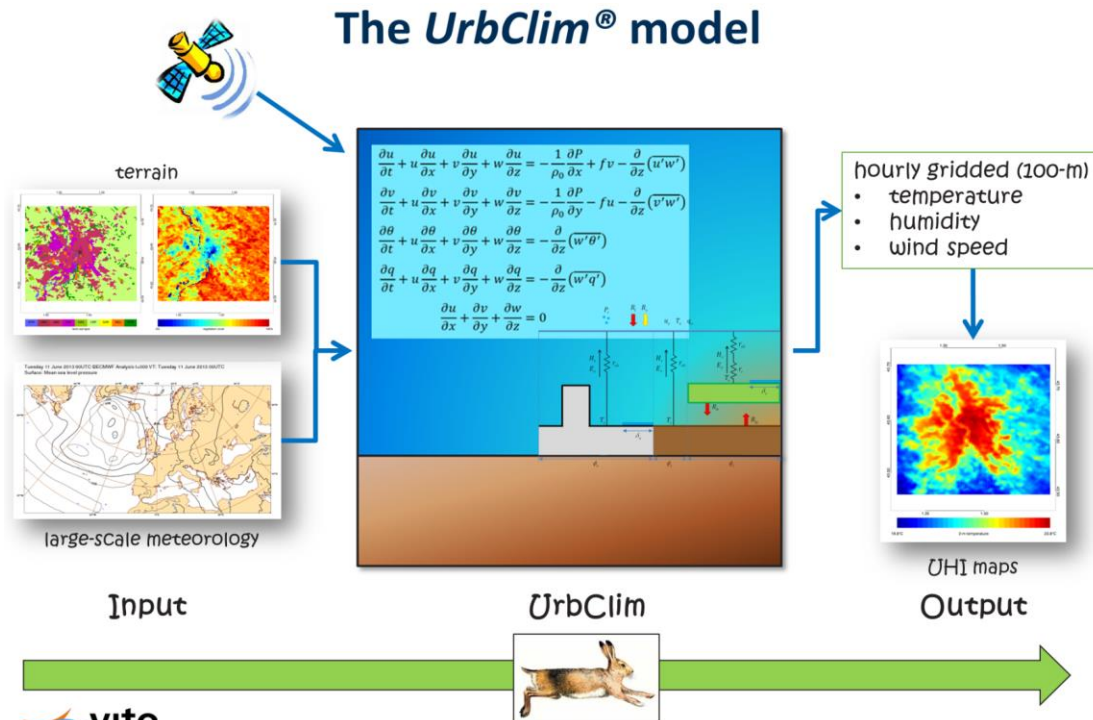
- High-resolution heat stress indicator maps and climate adaptation scenario analysis for two demo cities
- Integrated heat stress application on DestinE System components with the potential to be applied for any city in Europe



Potential urban heat stress adaptation measures. Source: Google images.

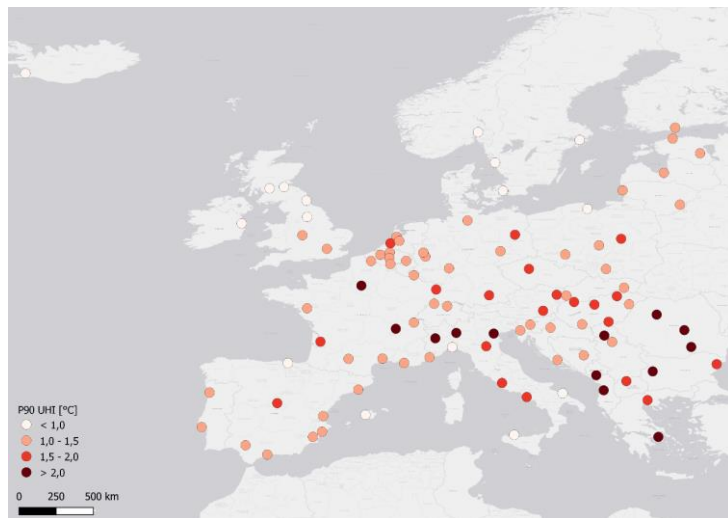
Urban Heat: Urban Climate Model

VITO has developed a high resolution urban climate model that can cover entire urban agglomerations and can be easily set up for any city in Europe

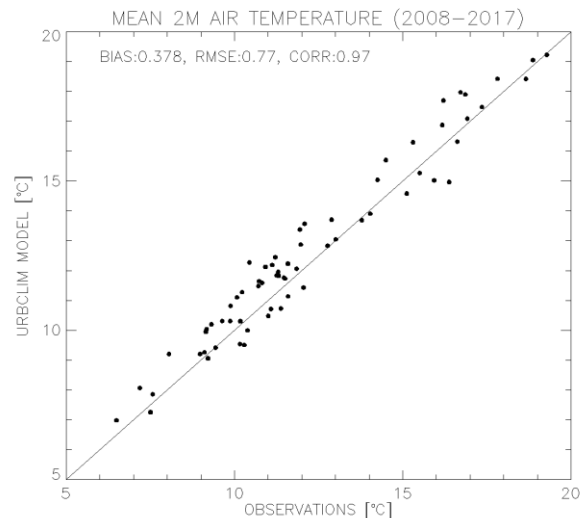


Urban Heat: Urban Climate Model

- The UrbClim model has been applied before in a pan-European context, providing detailed urban climate data for 100 cities in Europe (Copernicus Health contract for the C3S data platform)
- The model has been extensively validated for a lot of cities in Europe



Spatial distribution of a UHI indicator for all 100 modelled cities in Europe. Source: VITO.

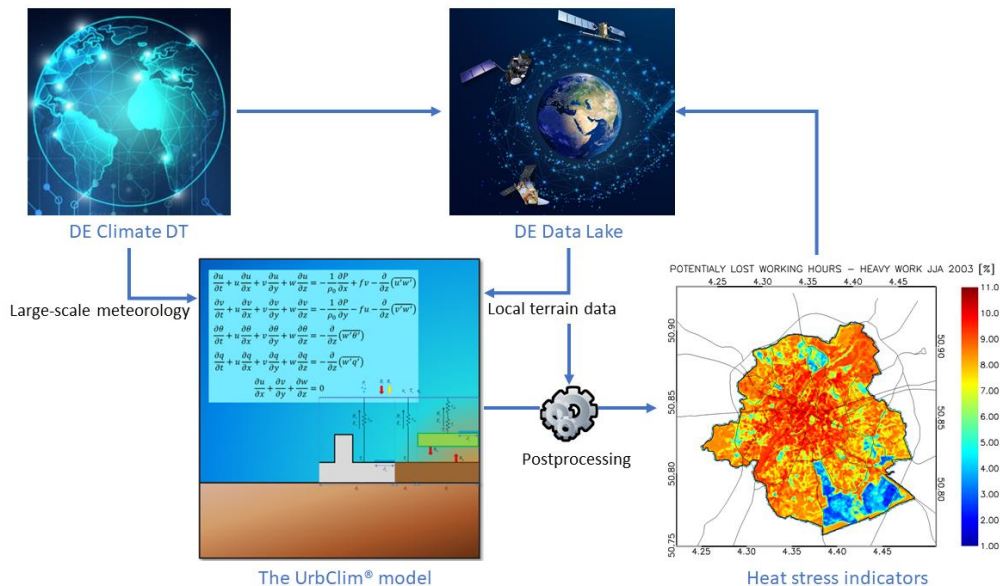


Comparison between observed and modelled average 2m air temperatures for 67 measurement stations. Source: VITO.

Urban Heat : Work planned

Developments

- Development of UrbClim and thermal comfort calculations nested in DE Climate DT and DE Data Lake datasets on VITO infrastructure
- Full integration of the urban heat stress application on DestinE System components when they become available
- For 2 demo cities: climate change and adaptation scenario analysis for heat stress related indicators



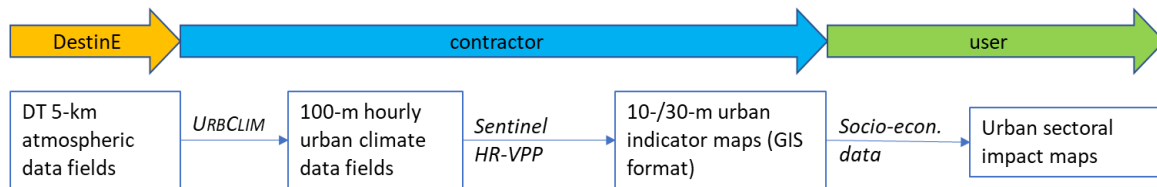
Urban Heat: Integration with DestinE

DestinE capabilities used

- Improved high resolution (5 km) global climate model output fields (Climate DT)
- Auxiliary data, e.g. terrain data accessed via the Data Lake
- Use of DT Engine interfaces and DE Service Platform functionalities

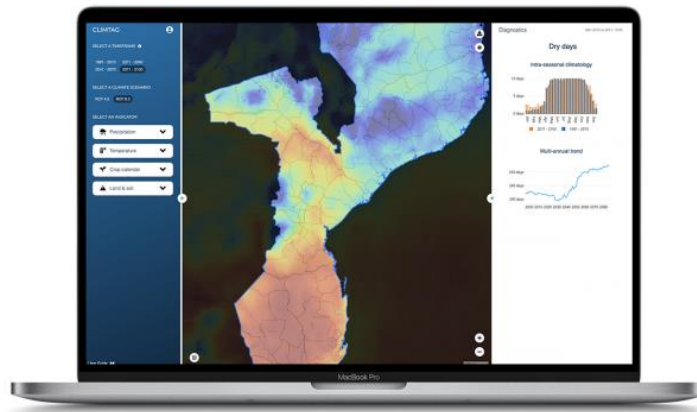
Capabilities provided to DestinE

- Local downscaling of global climate model results to very high resolution over selected cities (10-30m)
- Calculation of specific heat stress and indicators
- Future climate projections and heat stress adaptation scenario analysis



Key innovations / beyond status-quo

- High-resolution **urban heat maps & indicators** based on output of state-of-the-art climate models in the DestinE DT platform
- Assessment of climate adaptation scenarios in off-line postprocessing
- **API** to launch the service & **interactive interface** to analyze the results
- Engagement of the broader **user communities**



Example user dashboard based on the GEOVIEW software platform. Source: VITO.

Urban Heat: Schedule

