cityCLIM

CITYCLIM UPDATES

JANUARY 2023

THIS ISSUE

Model Viewer

Model Editor & GCCP

Spaceborne Data Processor

EO-Based Simulation

Citizen Science & Pilots

DELIVERABLES

Besides the conceptual deliverable D7.2, the consortium also worked on and submitted several other deliverables and reports by the end of 2022. We submitted a quality assurance plan (D9.1). An update on our dissemination and communication efforts (D8.2) as well as a report on the CityCLIM framework (D1.4).

WHAT HAVE WE WORKED ON?

The CityCLIM consortium has taken some major steps towards completing the conceptual framework of both the General City Climate Platform (GCCP) as well as the City Climate Services (CCS) and finally the specification and infrastructure setup for all of the involved Pilot cities.

Technical partners OHB Digital Solutions GmbH (OHB-DIG), OHB Digital Services GmbH (OHB-DS) and OHB System AG (OHB-SYS) and Meteologix AG/Kachelmann GmbH (MTL) as well as Helmholtz-Zentrum für Umweltforschung GmbH (UFZ) have had many periodical and special meetings with representatives of all the four Pilot cities (Valencia, Region of Central Macedonia, Luxembourg City, Karlsruhe) to understand the existing infrastructural conditions: for example: Are there any weather sensors available? Are any air quality sensors available? Does the city have a 3D city model or special land-use data sets, cadastre data, emission data, and so on. Thus, the initial effort was to determine, what data is already given and can be used as (ground truth) input data for the UltraHD model in order to make use of the existing resources effectively.

The next step was to establish a final wish list of all Pilot cities, that is, understanding what services are needed and which of the envisioned Climate Services can help each Pilot city with their very specific needs to adjust to Climate Change induced problems for their citizen and infrastructure.
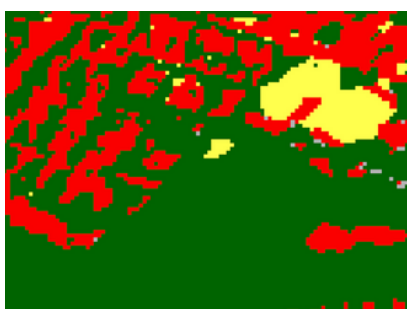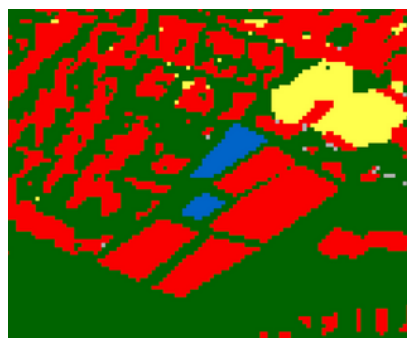
All results of this needs analysis as well as a detailed description of existing data streams and envisioned implementation plans for the next steps of development are documented in D7.2.

THE MODEL VIEWER
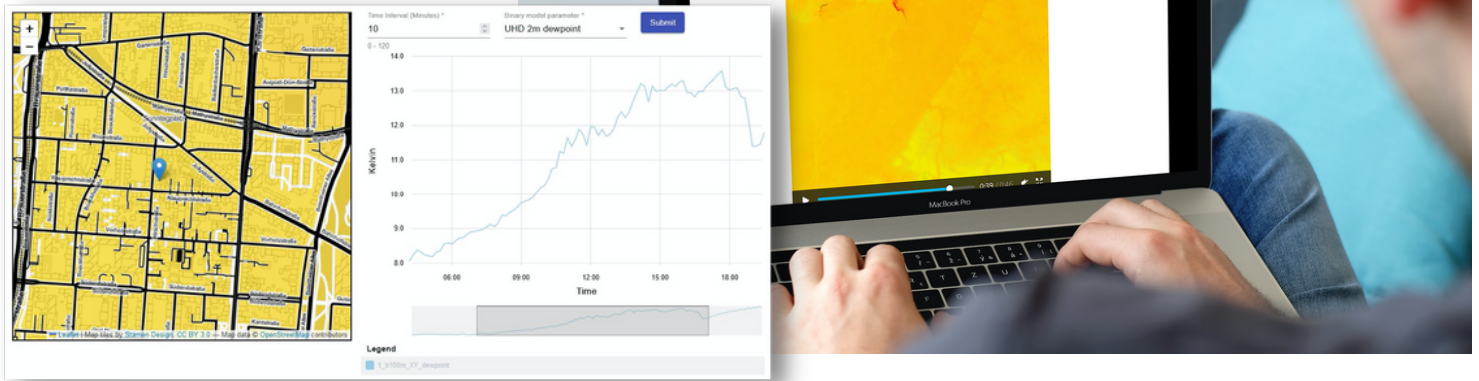
The model viewer is under heavy development - it is planned to be a tool that allows to browse through the output from the operational model runs for each pilot city and change parameters as well as time steps. It will be a SAAS-solution for the Pilot cities to view their own model runs: e.g., the Heat-Wave-Information Service. Since the implementation of post-processing algorithms for weather model outputs have reached an adequate level of maturity, further integration of statistical analysis for local urban areas and on aggregated model runs including visualizations have started. Current focus is set to finalize Early Prototype variants of the graphical user interfaces within the web application and architecture design of the Generic City Climate Platform.

THE LAND-USE EDITOR

GCCP

The CityCLIM consortium made further progress in the specification of the Generic City Climate Platform (GCCP). Efforts have been made to design an appropriate software architecture in line with the elaborated CityCLIM use cases and requirements.

The GCCP will enable the cooperation and collaboration of City Climate Services, Engines, Data Processors and connected third party components, and will be open for the integration of further third party contributions beyond the project.

Special attention has been given to cybersecurity, i.e. authentication and authorization of users and software components in the front- and back-end, as well as monetization mechanisms that will allow dynamic context-based accounting/pricing/incentives.

The land-use editor is a functionality within the Administration Service SaaS-Tool built by OHB-DS that allows the user to manipulate land-use input data to generate potential city planning scenarios. A user can then for example try out how a typical heat-day in their city would play out if certain buildings would be built on a site that is now still green or test out, how the micro climate would change if certain buildings would be removed and asphalt spaces unsealed. The three pictures show on a 2-dimensional map, how the red and blue areas can be removed within the editor. This so manipulated data set gets saved within the application and passed to the UltraHD processor to initiate a new model run with the new land-use input data.

SPACEBORNE DATA PROCESSOR

Land Surface Temperature

The University of Valencia (UVEG) team have developed an operational spaceborne data processor to retrieve high-resolution thermal data based on the fusion between Low-Resolution thermal data and High-Resolution optical data.

With the new data now we can get urban thermal metrics like the Surface Urban Heat Island index, which allow us to understand the distribution of the temperature in heterogeneous areas like urban environments.
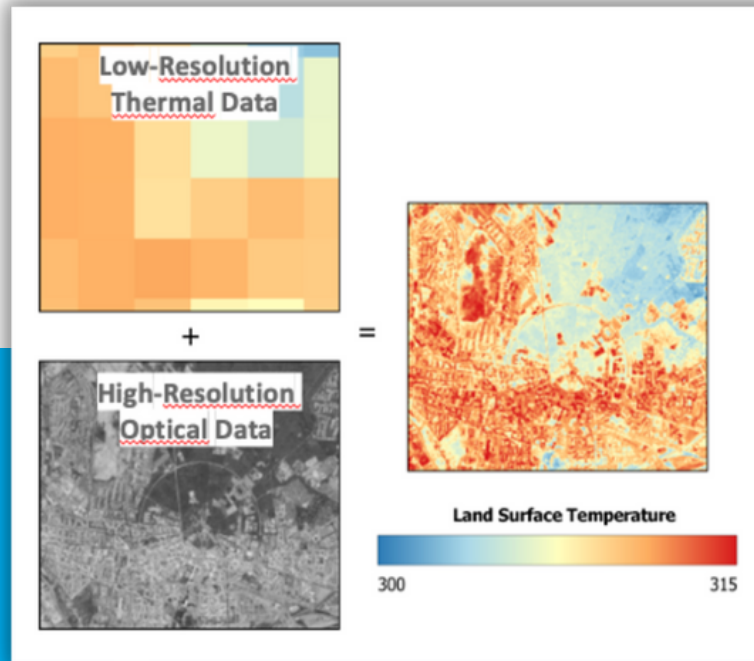
IN-SITU DATA PROCESSOR VALENCIA

Connections to the Valencia data have been established to the GCCP.
Three different data types are received from the city of Valencia:

- Data from the Air Pollution Monitoring Network
- Data from the Weather Monitoring Network
- Data from the On-Boarded Stations that are mobile stations measuring weather and pollution data

EARTH OBSERVATION (EO)-BASED HEAT ISLAND SIMULATION AND MITIGATION STRATEGIES SERVICE
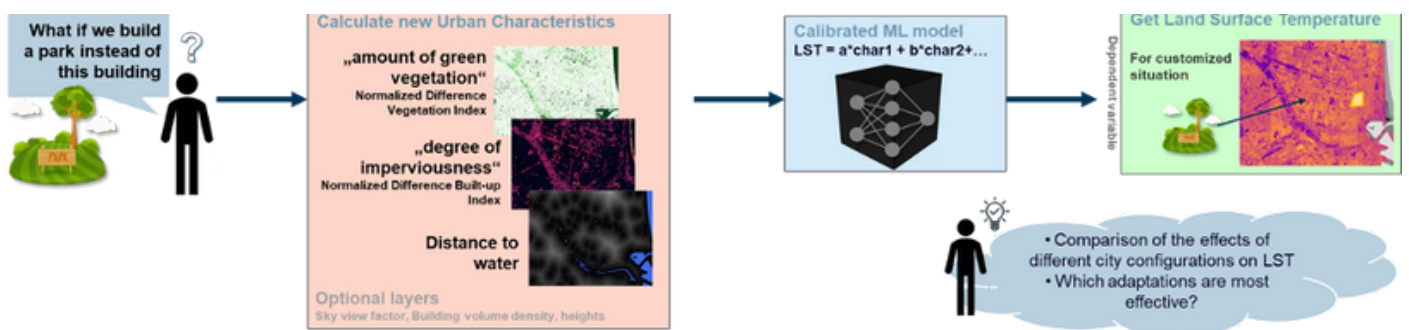
In CityCLIM, OHB System AG developed the concept for a "Heat Island Simulation and Mitigation Strategies Service" which is solely based on operationally available Earth Observation data. It is a scenario tool where users from city administrations or the interested public can explore how Land Surface Temperature in a city changes when urban characteristics (e.g., surface material as sealed, urban green or water surface or the building geometry) are modified. The engine will be available for all four pilot cities on, e.g., 50m spatial resolution and has the potential to be extended to other interested cities. It is an experimental parallel approach to the UltraHD-based services.

CITIZEN SCIENCE AND CLIMATE SERVICES IN CITIES
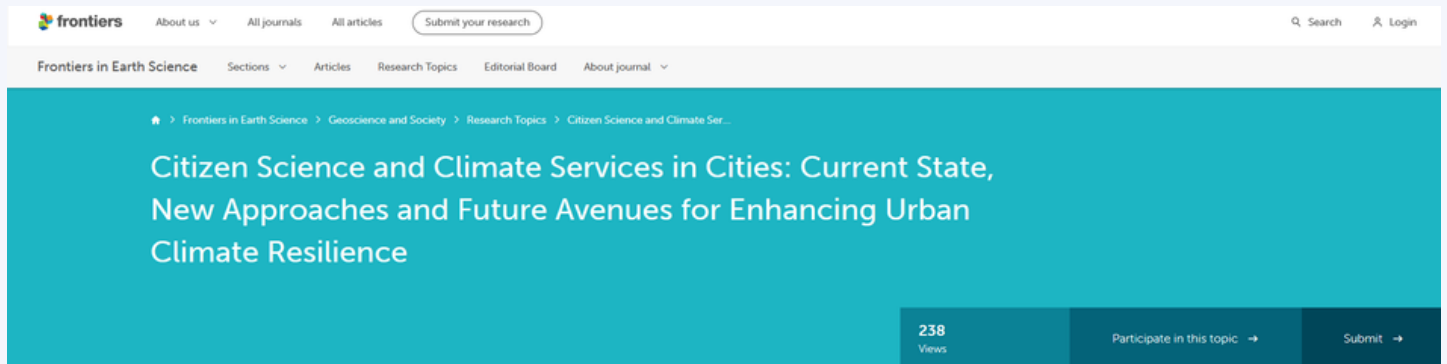
Special Issue of Frontiers in Earth Science with topic "Citizen Science and Climate Services in Cities" organized and edited by the UFZ CityCLIM team

RCM (THESSALONIKI)

Thessaloniki has already received 5 Barani weather stations with temperature and humidity sensors, barometric pressure sensor and wind direction and velocity sensor.

Currently they are looking for the proper locations to install the weather stations, trying to achieve the best spatial distribution.

Ongoing discussions with the city administration about the citizen science project.

KARLSRUHE

- Brainstorming citizen science activities
- Search for weather station locations
- Busy getting more weather sensors for Karlsruhe, additional to the ones from within the project
- Busy getting data from existing sensors in Karlsruhe

The special issue in Frontier is launched January 2023, Deadline for submission July 18, 2023. 3 abstracts by CityCLIM team members have been accepted for presentations at EGU:
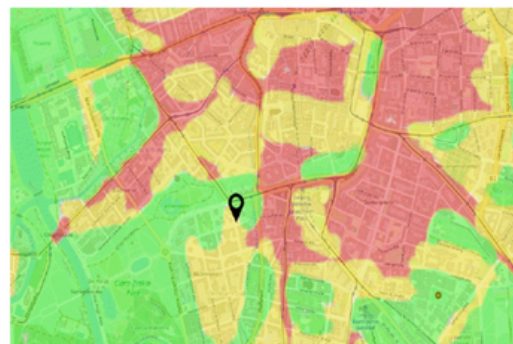
- *Improving efficiency of citizen science projects by targeted activation of selected stakeholder groups* by Christine Liang et al. (UFZ)

- *Comparison of Mobile Environmental Sensors for Citizen Science Based Climate Monitoring* by Felix Schmidt et al. (UFZ)

- *CityCLIM - From an operational city weather forecast to a suite of services addressing the urban environment* by Stefan Horn and Janek Zimmer (MTL)

SENSATION WEATHER MAP

Partners RTL-Luxembourg, UFZ and MTL are working together on an Early Prototype implementation fo the sensation map within the weather services of RTL Luxembourg.