Protecting citizens from heat – using Open Data for Heat Action Plans (Ready4Heat)

Interreg CENTRAL EUROPE

Co-funded by the European Union

Ready4Heat

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EUROPE

Heat waves in Europe killed more than 61,600 people last summer, a study estimates

JULY 12, 2023 · 11:39 AM ET

By Rachel Treisman

[For 2022]

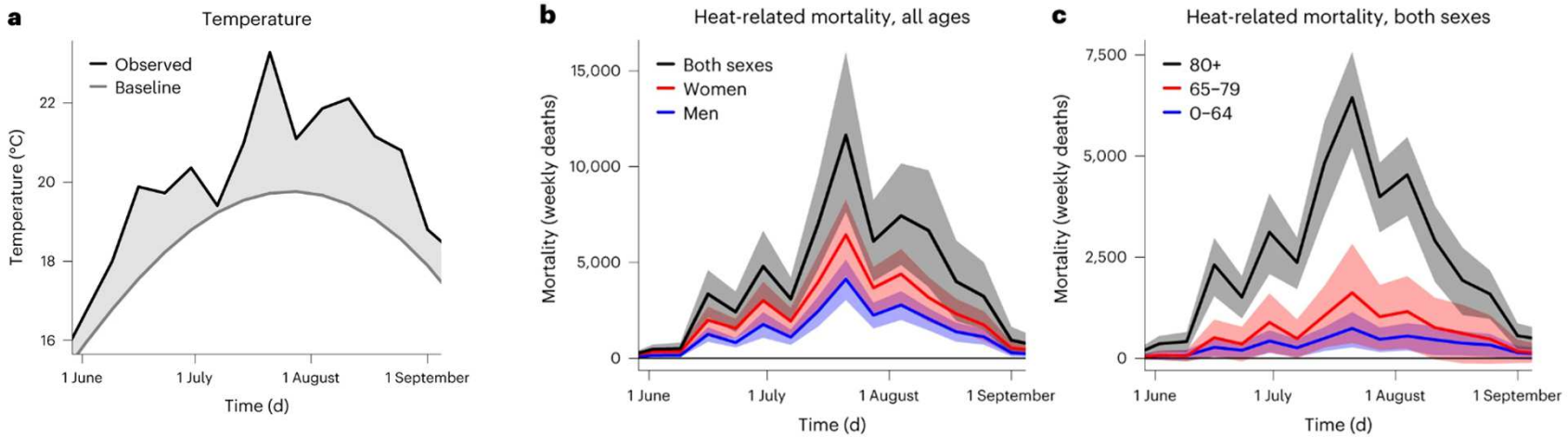
HEAT

The Philadelphia Inquirer

NEWS > NATION WORLD

More than 1,300 people died during Hajj, many of them after walking in the scorching heat

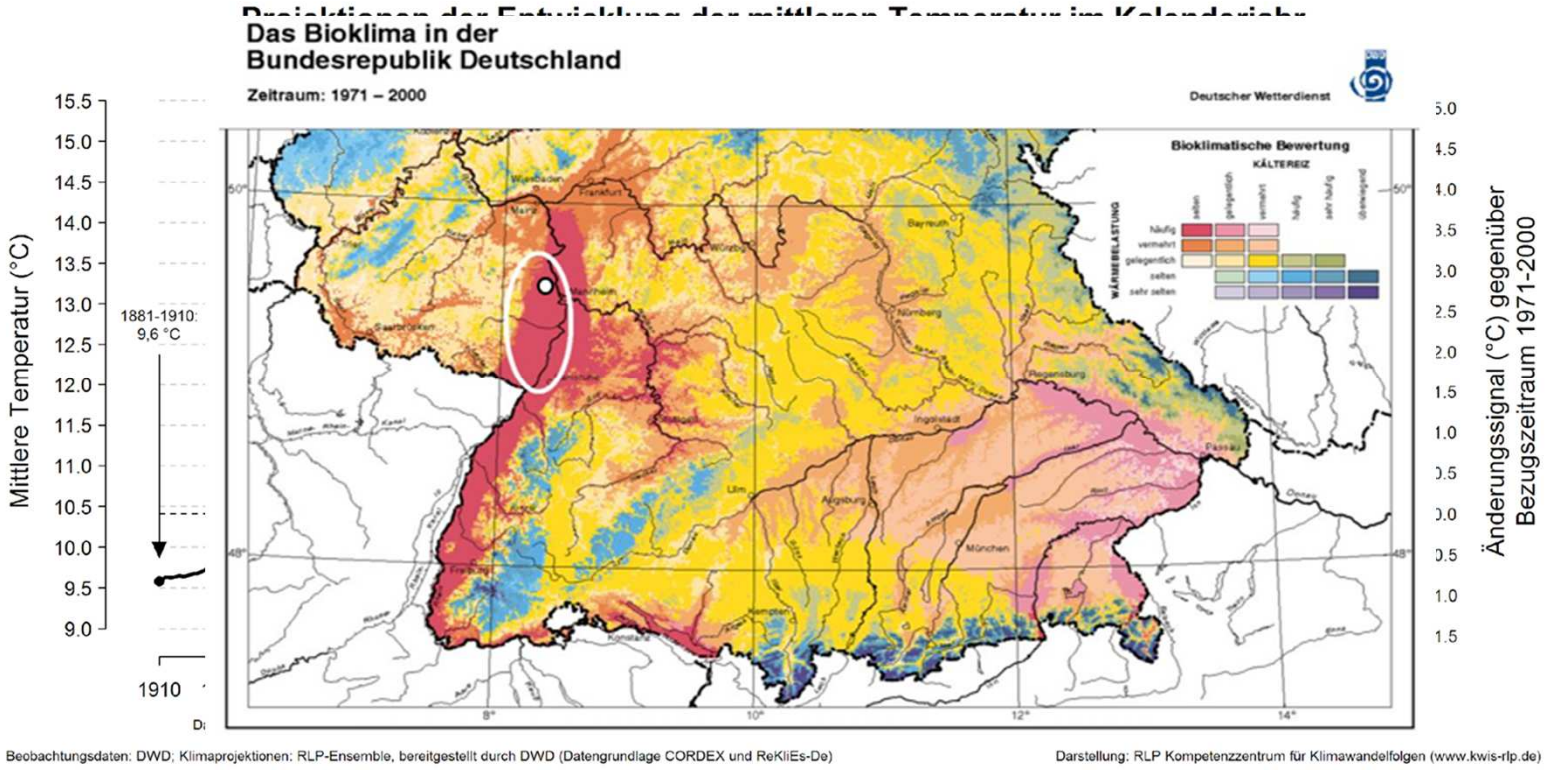
Heat becomes serious threat



"We estimated 61,672 (95% confidence interval (CI) = 37,643–86,807) heat-related deaths in Europe between 30 May and 4 September 2022."

Source: Ballester, J., Quijal-Zamorano, M., Méndez Turrubiates, R.F. *et al.* Heat-related mortality in Europe during the summer of 2022. *Nat Med* **29**, 1857–1866 (2023). https://doi.org/10.1038/s41591-023-02419-z

Local vulnerability forces to act



Worms Heat Action Plan

„Lighthouse“ project to create a heat action plan for the city of Worms in 2020 – one of the first German heat action plan

Goals:

- Heat stress analysis in the city
- Create short, medium and long term adaptation measures
- Form stakeholder networks
- Focus on “Vulnerable Groups” - Elderly, children, low income households, outside workers, pregnant- and chronically ill persons

https://www.worms.de/neu-de/zukunft-gestalten/klima-und-umwelt/Klimawandel/Hitze/Hitzeaktionsplan.php

Developing Ready4Heat on the base of the Worms Heat action plan

From Worms to Europe –
Weiz, Austria
Maribor, Slovenia
Hajdúböszörmény, Hungary

Ready4Heat process

Pergola in Maribor, Source: City of Maribor

Create Heat Analysis

Transfer of knowledge from Worms to pilot cities

Creat Heat Action Strategy

Install pilot actions like Pergola for Kindergarden

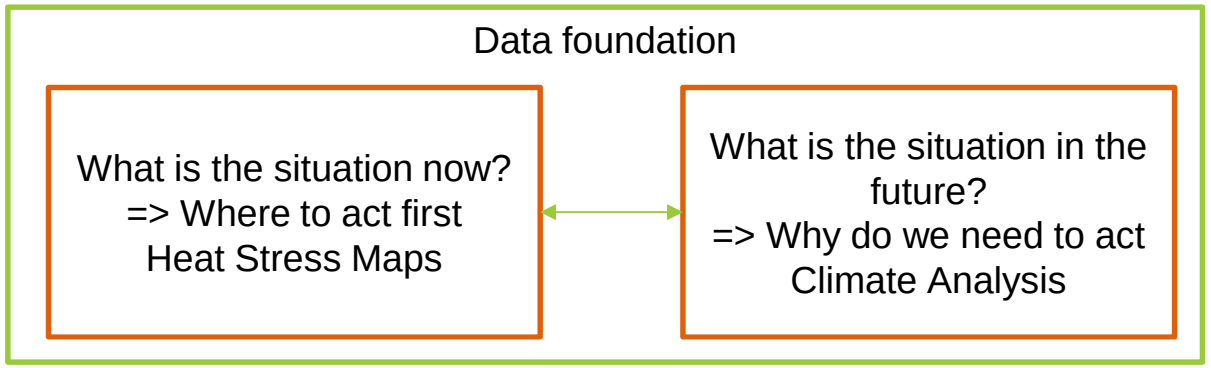
Create stakeholder networks

Formulate own heat adaptation strategy

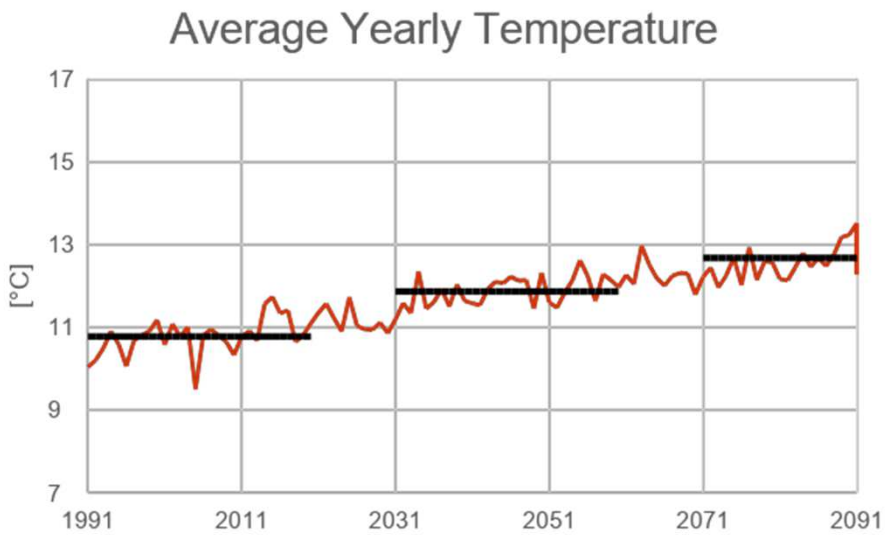
Heat maps with free open source data

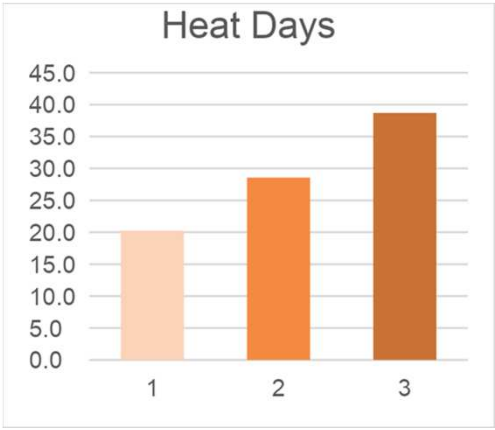
Priorisation on certain aspects:

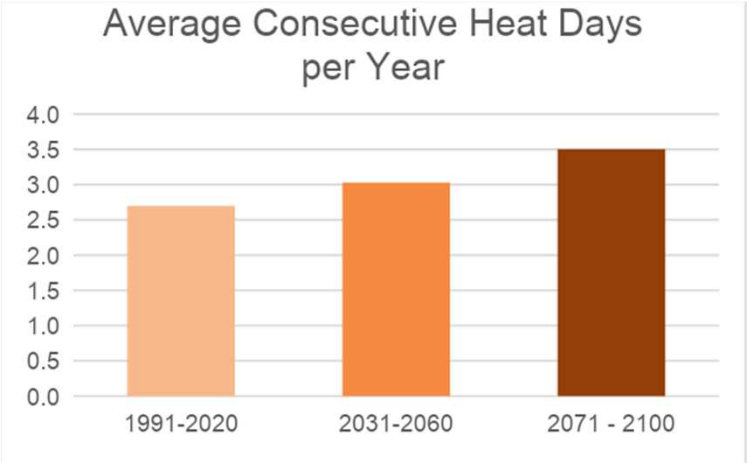
- No need for licensing fees
- Time constraints
- Work power constraints
- Limited data from „special“ sources as possible



Analysis of future climate situation - Example Maribor







Three periods were compared in the analysis
1991-2020 : 8,05 °C
2031-2060 : 9,12 °C
2071-2100 : 9,94 °C

Open Source Heat Map Creation

Finding out Heat Days

Get Reanalysis data with hourly weather variables for Europe
- Copernicus Climate Data Store

Analyse Data

Filter through data for days over 30°C via website toolbox (~Python) or a specialised tool called CDO by Max-Planck-Institute for Meteorology

Find Satellite Images

Landsat 8/9 Images are available every 8 days + atmospheric corrections

Calculate Land Surface Temperature

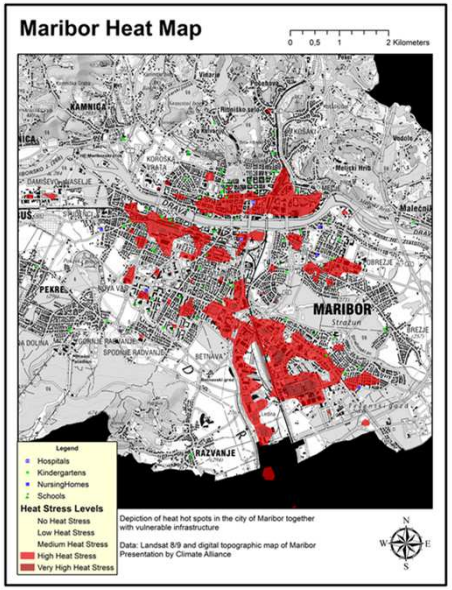
Use GIS tools to calculate surface temperature using satellite bands 4,5 and 10 + atmospheric corrections

Repeat and Average

Create multiple maps with landsurface temperatures to create average values

Present the Hotspots

Classify the results in a way to show the highest temperatures in a city

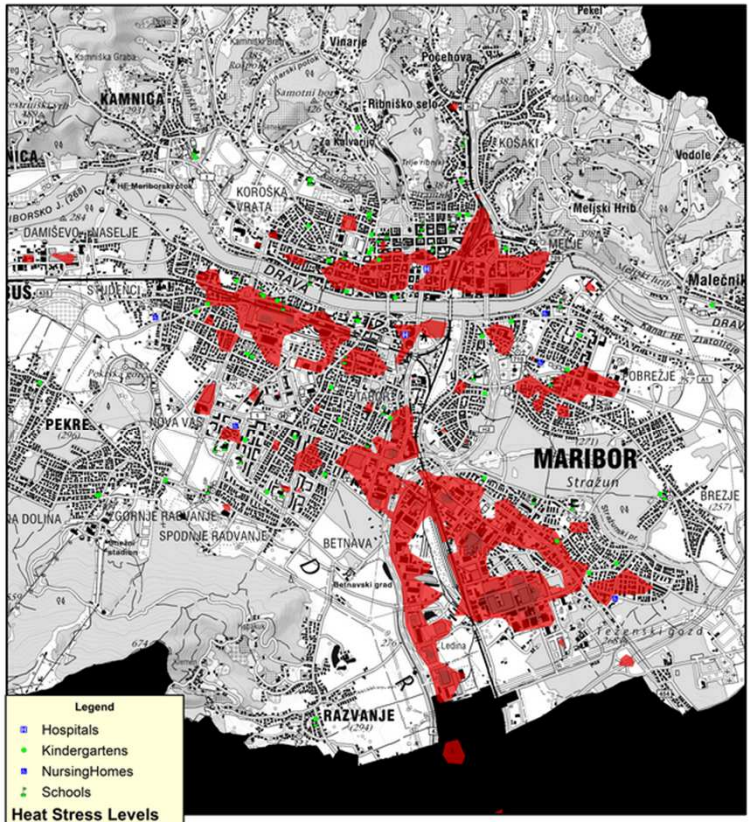


Integrate Local Data

Combine the heat maps with local Infrastructure for vulnerable groups or demographic data

Maribor Heat Map

0 0,5 1 2 Kilometers



Legend

- Hospitals
- Kindergartens
- NursingHomes
- Schools

Heat Stress Levels

- No Heat Stress
- Low Heat Stress
- Medium Heat Stress
- High Heat Stress
- Very High Heat Stress

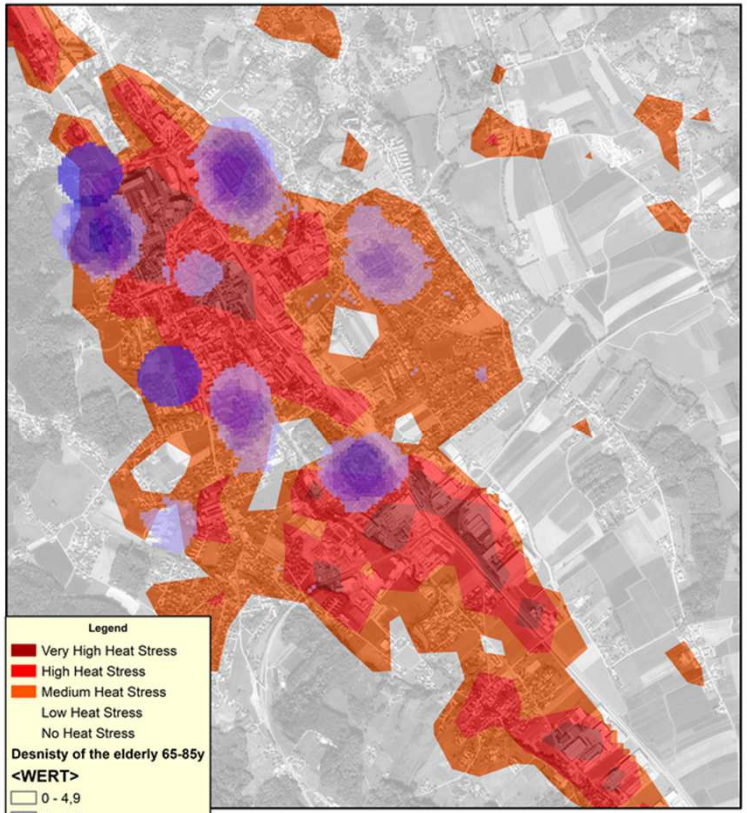
Depiction of heat hot spots in the city of Maribor together with vulnerable infrastructure

Data: Landsat 8/9 and digital topographic map of Maribor
Presentation by Climate Alliance

N W E S

Weiz Heat Stress

0 0,25 0,5 1 Kilometers



Legend

- Very High Heat Stress
- High Heat Stress
- Medium Heat Stress
- Low Heat Stress
- No Heat Stress

Desnisty of the elderly 65-85y

<WERT>

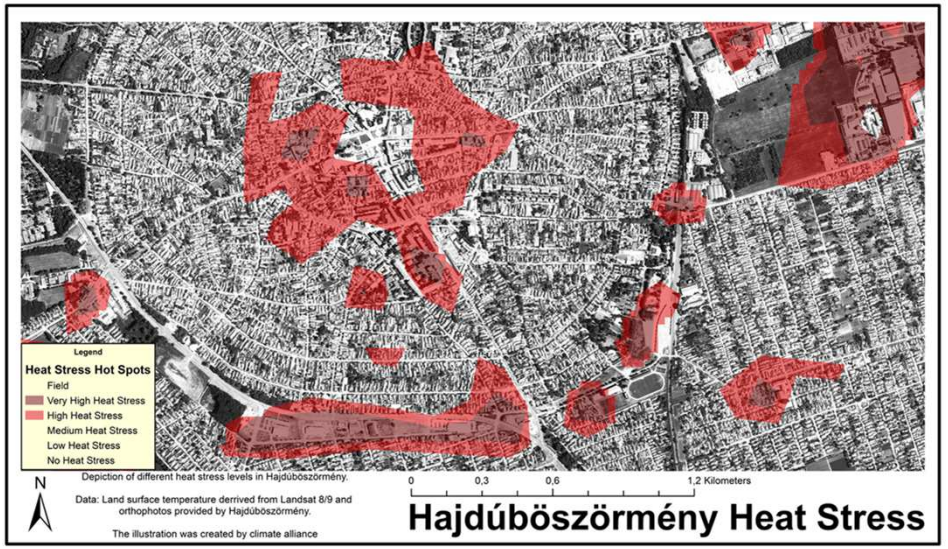
- 0 - 4,9
- 5 - 7,7
- 7,8 - 9,6
- 9,7 - 11,9
- 12 - 14,6
- 14,7 - 25,5
- 25,6 - 33,8

Depiction of different heat stress levels in Weiz together with the density of elderly people between 65 and 85 years.

Data: Land surface temperature derrived from Landsat 8/9 and orthophotos provided by Weiz
The depiction was created by climate alliance

N W E S

Use of heat maps in local stakeholder events



Resources needed

Input Data	Source	Open source?
Heat Day Dates	Copernicus Climate Data Store	Yes
Satellite Data (Landsat 8/9)	EarthExplorer	Yes
Base layer	Regional data bases – Open Street Map	Very often
Demographic Data	Local authorities	No
Climate Data	Cera Data Centre	Yes for non-commercial

Staff skills:

- Geographical Information System (GIS)
- Statistical Knowledge – to work with climate data
- Some coding experience or interest
- Depending on experience, between a few weeks and several months time required

Open source - better than ever

COMMISSION IMPLEMENTING REGULATION (EU) 2023/138 of 21 December 2022

Laying down a list of specific high-value datasets and the arrangements for their publication and re-use

- Free open source data use of certain GEO-Data in Europe

In Germany – See press release:

https://www.adv-online.de/Startseite/binarywriterservlet?imgUid=94f70f19-93b1-ff81-3406-3545427c8f09&uBasVariant=11111111-1111-1111-1111-111111111111

Summary

Advantages of this method:

- Where to act
- No licencing fees
- Can be used anywhere in Europe
- Relatively fast
- In-house
- **Politically relevant data - also for media**

Photo by the municipality of Hajdúböszörmény

Improvements:

Cold air flow analysis

Take a look a the results

Outputs

Municipal heat strategies and action plans for the mitigation of heat waves

Three local heat strategies and actions plans (for the cities of Hajdúböszörmény, Maribor and Weiz). Each document covers a strategic and structural part, as well as an action plan with concrete measures to improve the situation caused by heat waves. The development of the plans is based on a broad stakeholder participation process as well as discussions within the projects co-working groups. A heat and climate analysis of the pilot cities areas, as well as a strategy and action plan concept (which outlines the development and implementation process of a heat-health action plan and reflects the experiences made by the city of Worms) support the output development.

Type of output: **Strategies and action plans**

In development

Heat and climate analysis of the pilot cities areas
Strategy and action plan concept – UPDATED

SCAN ME

https://www.interreg-central.eu/projects/ready4heat/?tab=outputs

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Frankfurt am Main

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