

Using digital twin tool to understand climate risks and socioeconomic vulnerability in urban space - Example from the Regions4Climate project

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Hello everyone!

- Senior Project Manager at Forum Virium Helsinki, specializing in climate adaptation and digital twins.
- Expert in urban development, smart cities, new technologies, and green infrastructure.
- Experienced in urban and regional development from the Ministry of Economic Affairs and Employment, Finland.
- PhD in Urban Geography with a focus on urban and mobility experiences. Has studied economic geography.

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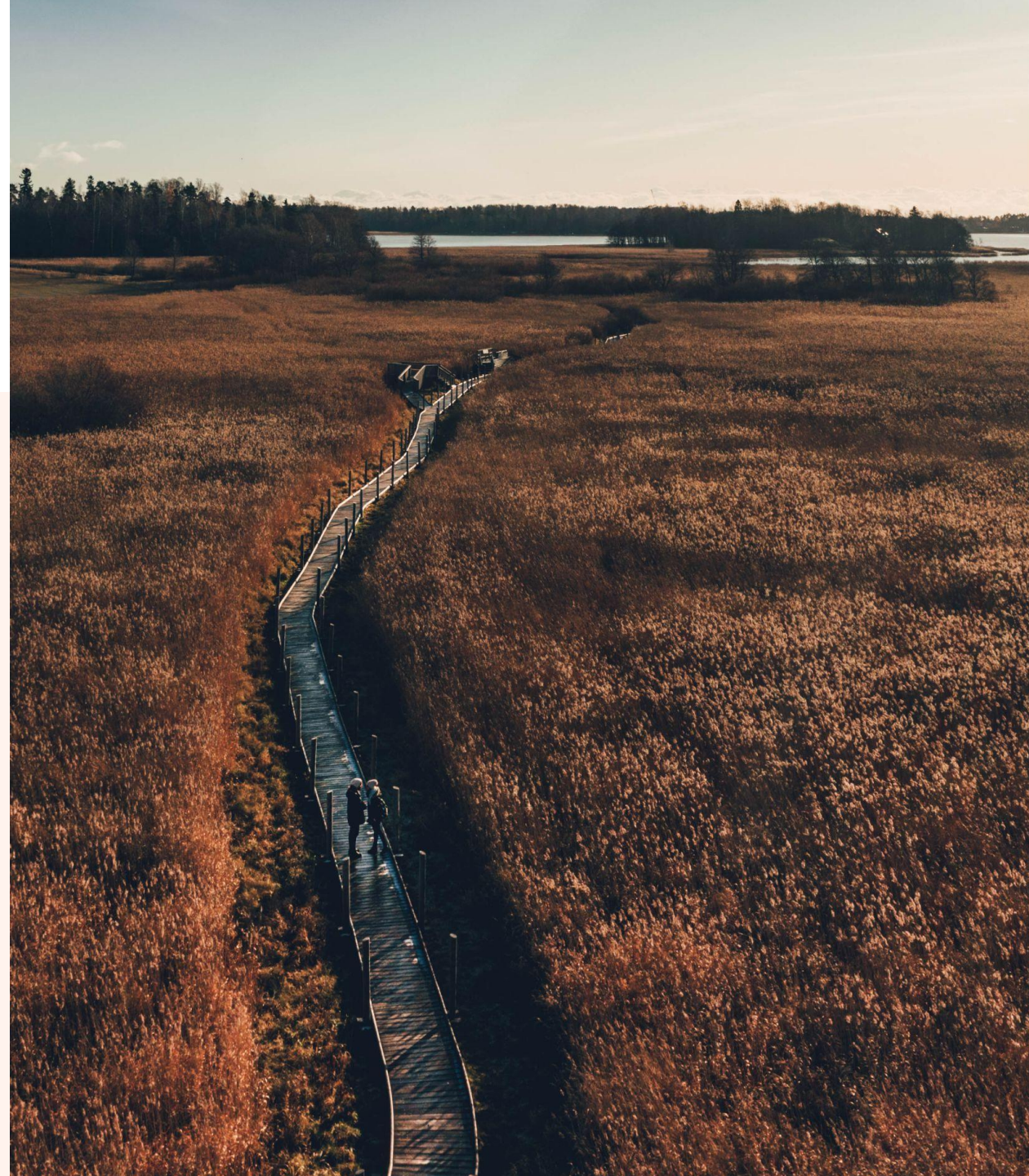
What is Forum Virium Helsinki?



- A non-profit innovation company of the City of Helsinki.
- Established in 2005.
- Three programmes: smart city, smart mobility and data.
- Employs 60 top experts.
- Annual project funding of EUR 4–6 million.
- The company is financed by the City of Helsinki and the EU.
- Customer satisfaction 4,4 / 5.
- Employee satisfaction 4,2 / 5
- Impact:
 - New companies and R&D
 - Smart city solutions
 - Open data

Regions4Climate (R4C) project

- 1/2023-12/2027
- 47 project partners
- Budget 24.9 billion, FVH's share is 881,750e.
- Horizon Europe funding
- Project funded by the EU's Mission for Climate Change Adaptation.



Climate adaptation requires increased focus

"I don't work on climate change topics."

"Heat periods are typically short."

"Severe urban floods...? Are they that common really?"



Definitions of digital twins

- Many cities are creating digital twins.
- Combining building and environmental data is of interest.
- Note! Terminology is confusing and varied (geospatial data, 3D models, etc.)



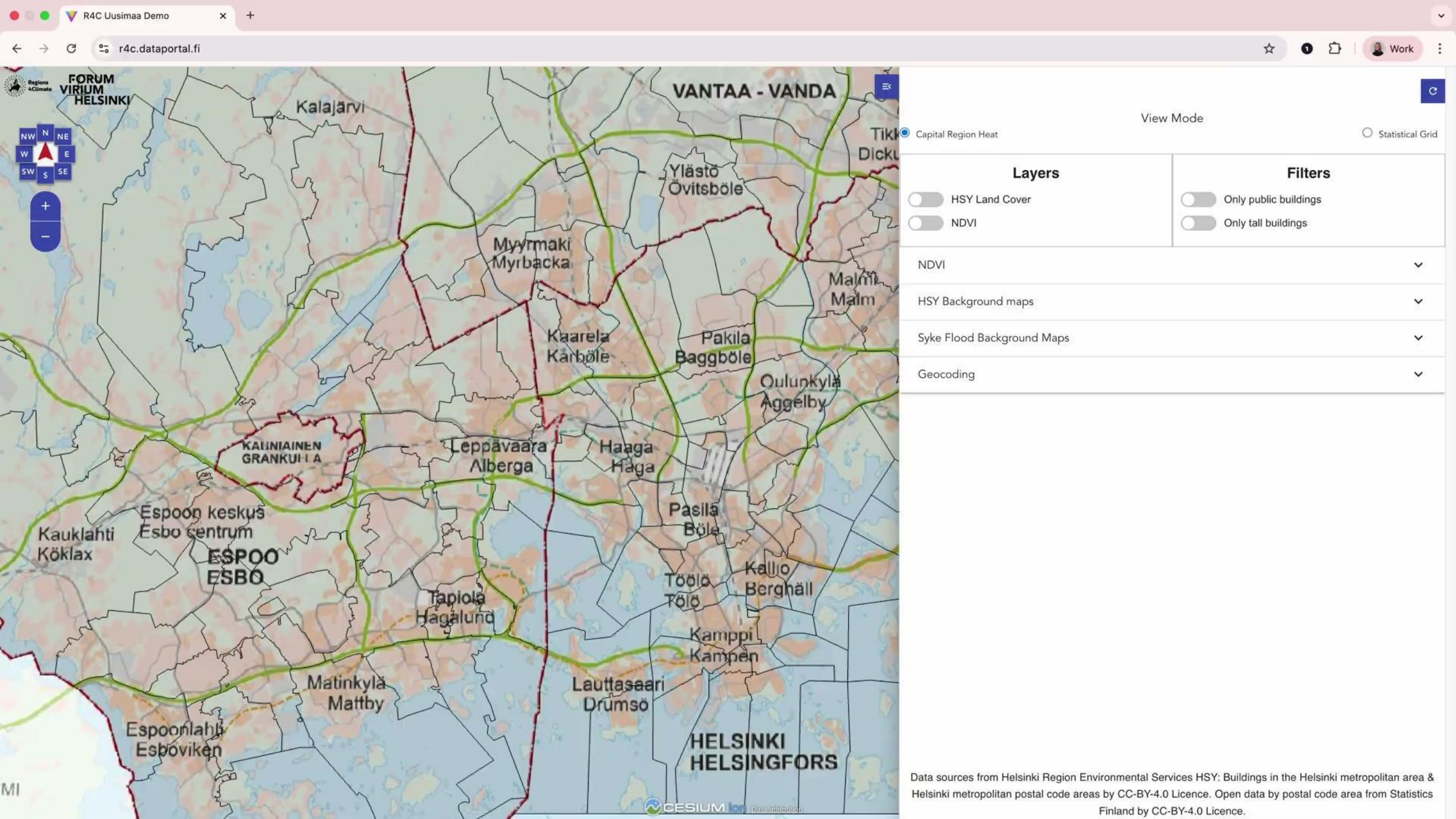
Demo tool to support climate change adaptation



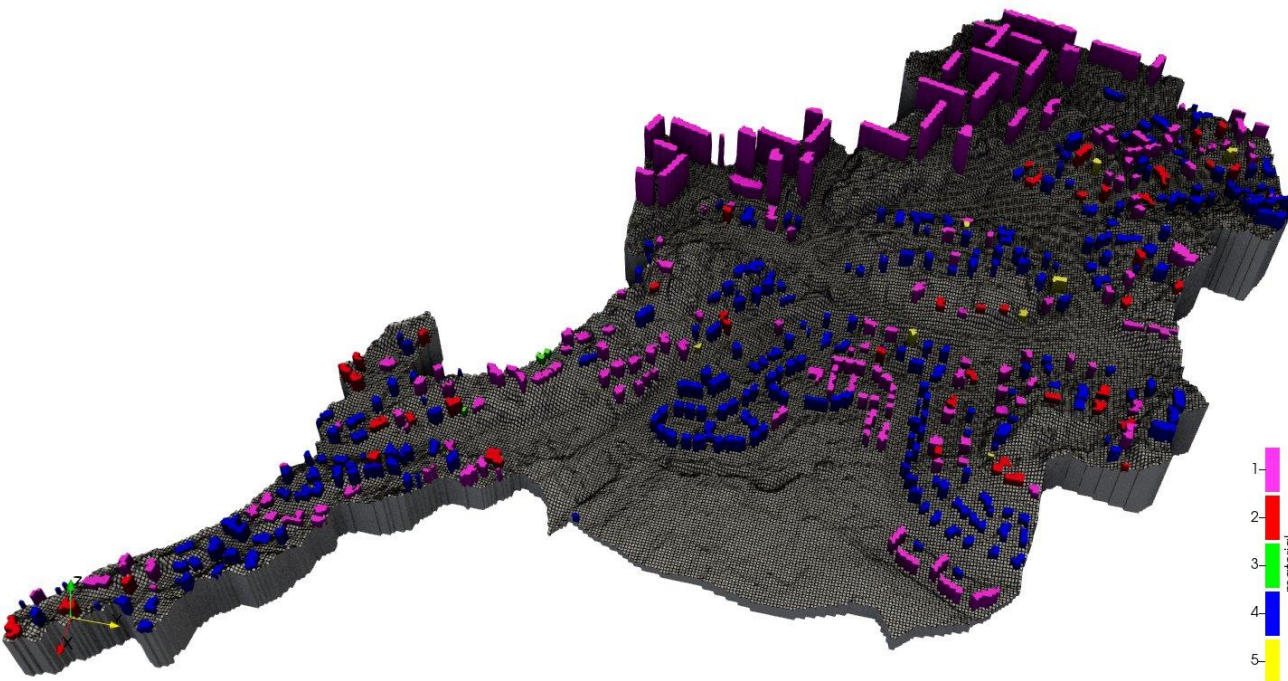
- The aim is to:
 - increase understanding of heat islands and stormwater floods,
 - promote a socially just transition to climate resilience, and
 - develop a digital twin demo tool for use by, for example, social and health care, rescue services, and urban and regional planners to support climate adaptation work.



Introducing the Demo Tool



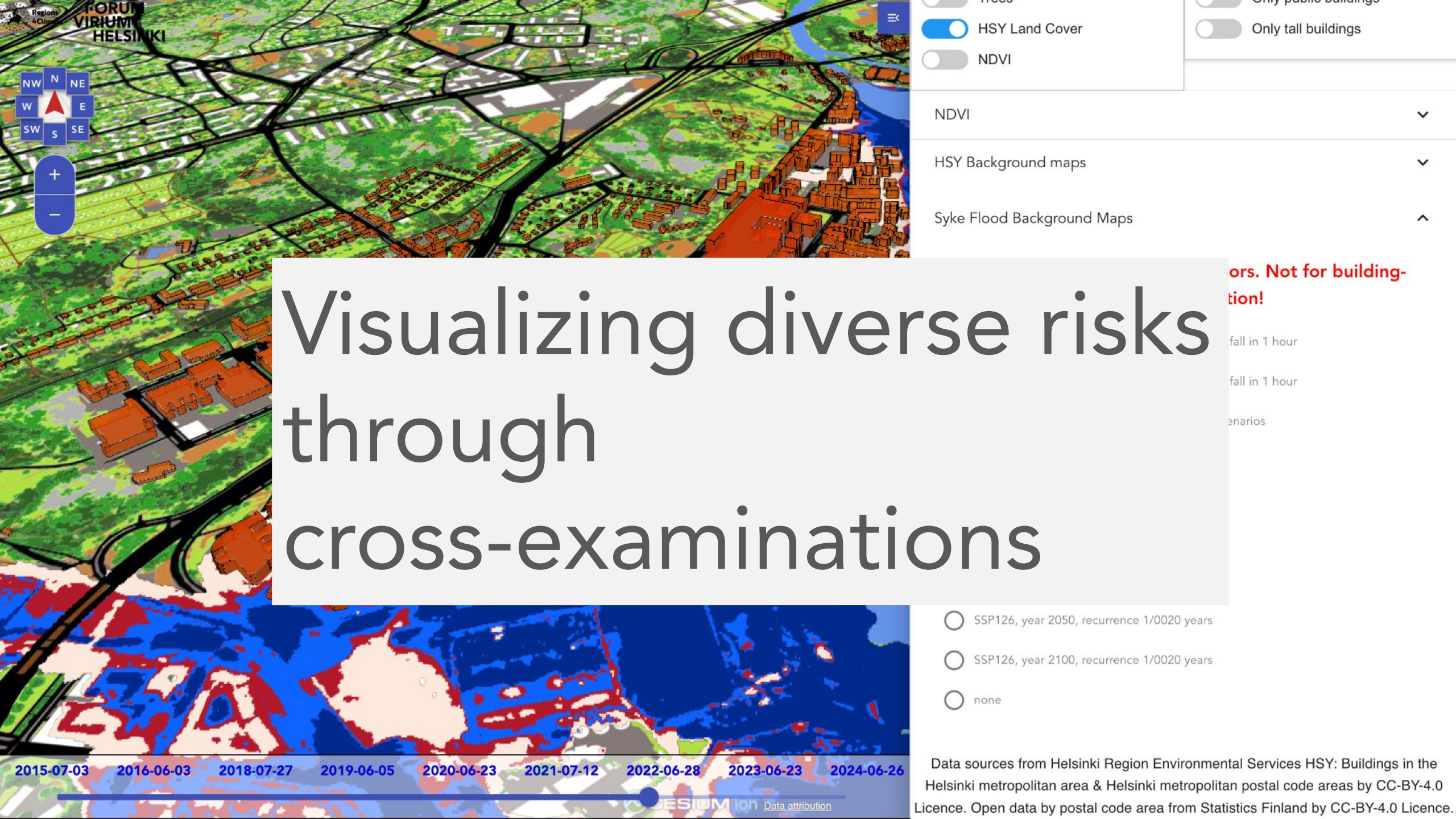
Heat and flooding modelling

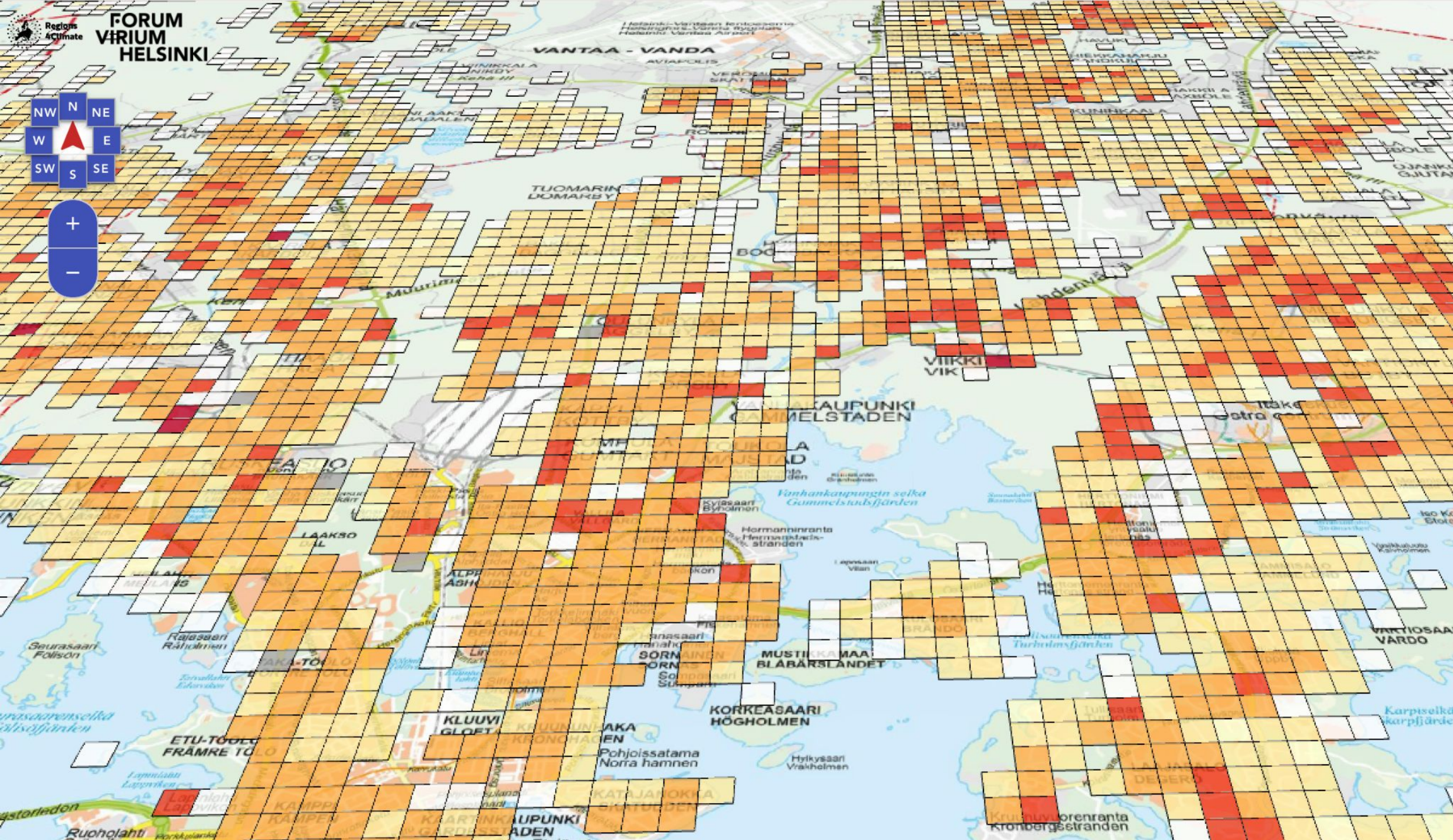


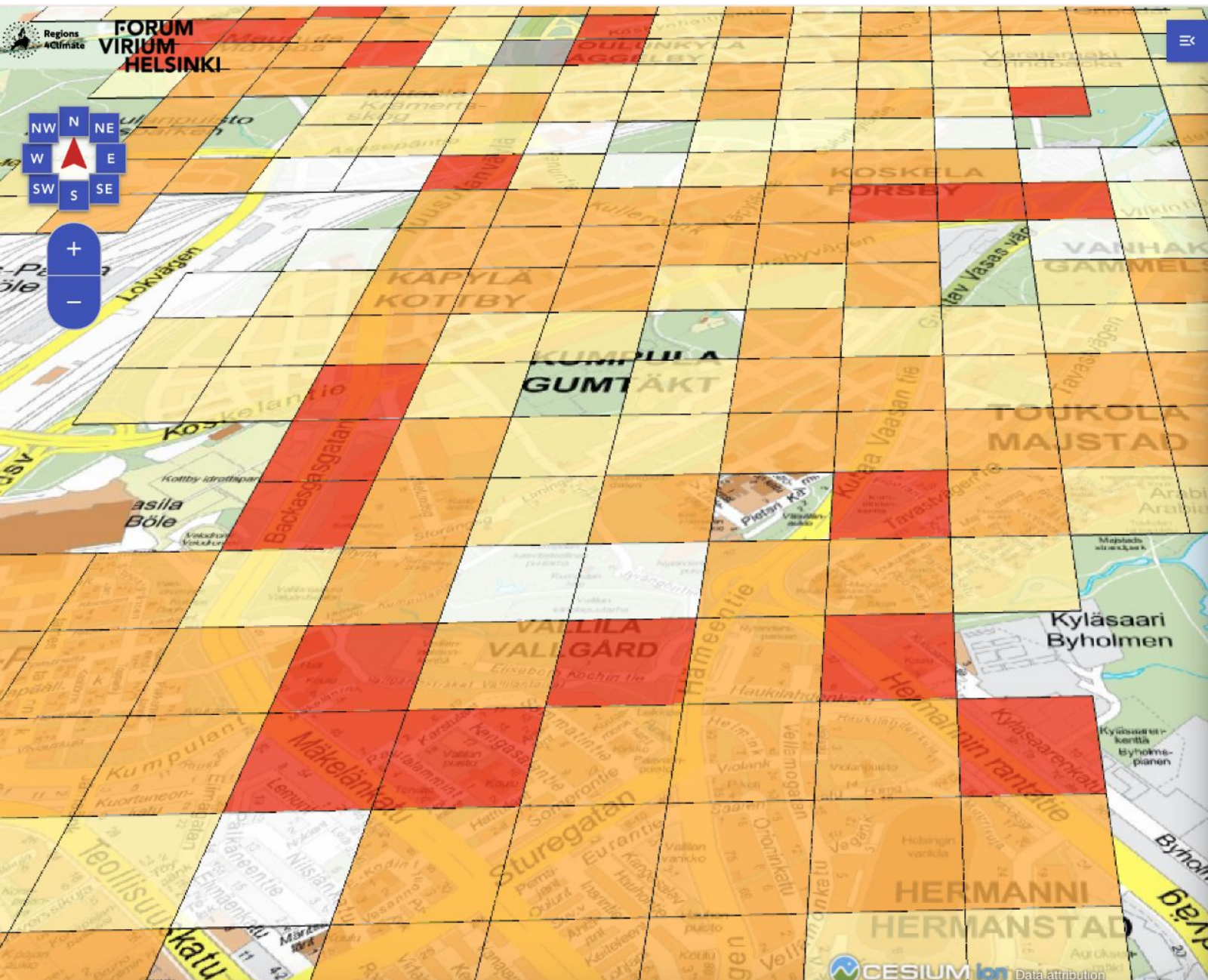
- The DT has two scales: a metropolitan area overview and a Laajasalo district view.
- Process-based modeling with ML/AI-assisted optimization (work led by VTT partners).
- The modeling simulates the heat island effect combined with urban hydrology.
- Heating system development continues simultaneously with the DT.



Social Impacts of the Digital Twin Demo Tool







Regions 4Climate

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View Mode

☐ Capital Region Heat

☒ Statistical Grid

Layers

☐ HSY Land Cover

☐ NDVI

Manage Cooling Centers

Add Cooling Centers

Cooling Center Capacity

1000

ADD

RESET

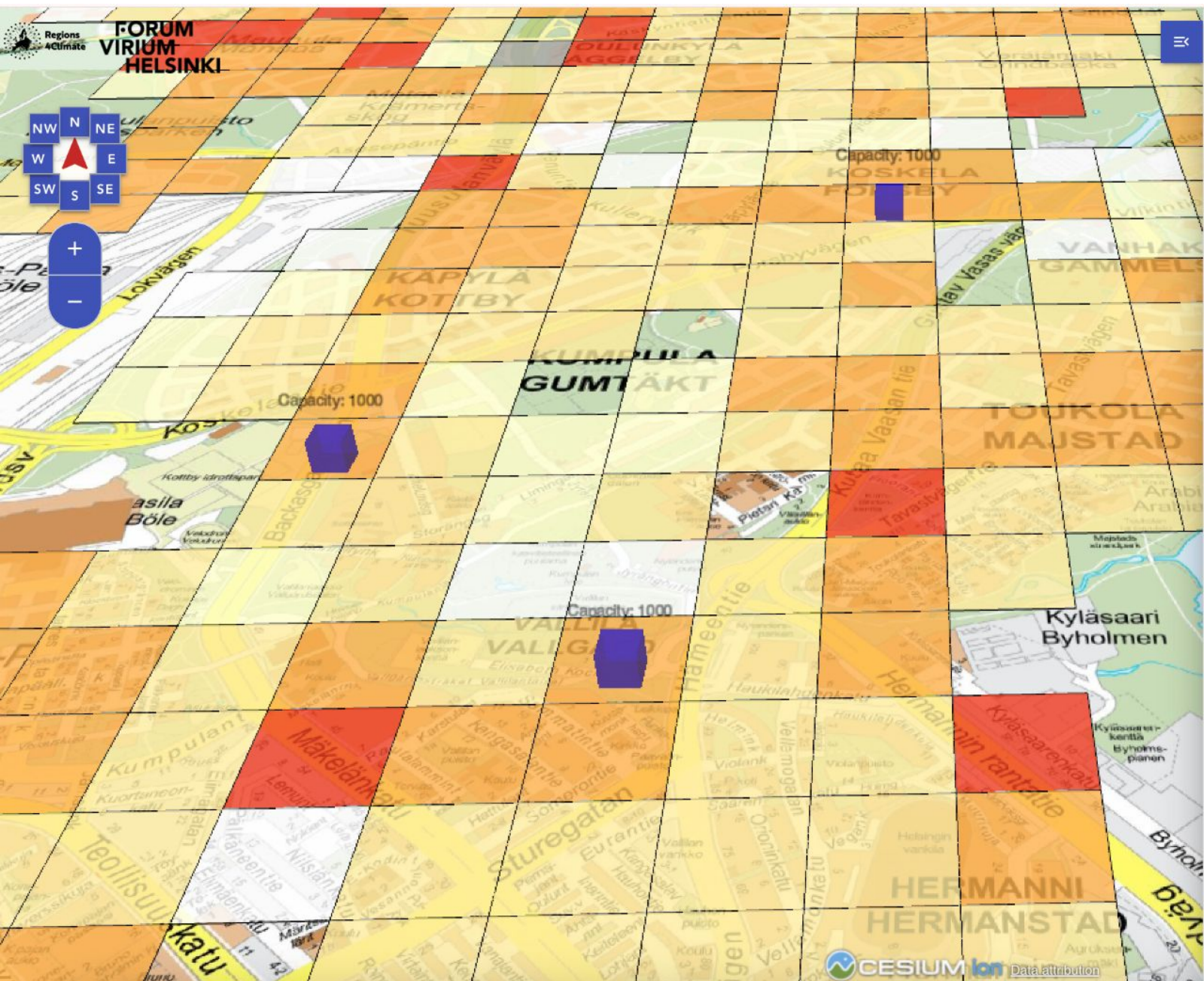
Cooling Center Optimization

Number of Cooling Centers

25

OPTIMISE LOCATIONS

Data sources from Helsinki Region Environmental Services HSY: Buildings in the Helsinki metropolitan area & Helsinki metropolitan postal code areas by CC-BY-4.0
Licence: Open data by postal code area from Statistics Finland by CC-BY-4.0 Licence



Regions Climate

FORUM VIRIUM HELSINKI

View Mode

☐ Capital Region Heat

☒ Statistical Grid

Layers

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“What is a cooling center?
We might need them in the
future.”

Connecting Data and Impact

- PROBLEM:
 - A gap exists between data and understanding social impacts.
- SOLUTION:
 - The demo tool serves as a bridge, not just a tool.



Questions:

- In future, the cities will be developed with AI.
 - Will it be optimization, user's choice? Or both?
- How can we ensure transparency in these choices?
- How do we ensure a socially just transition to climate resilience?



How to use the demo tool?

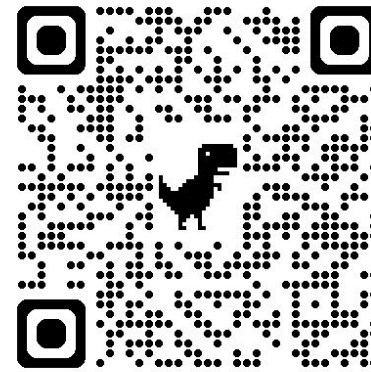
The free demo tool to support climate change adaptation is now available.

Register as a user at:

<https://r4c.dataportal.fi/>

Please note that use is only possible with Google system credentials.

We would love to hear your feedback!



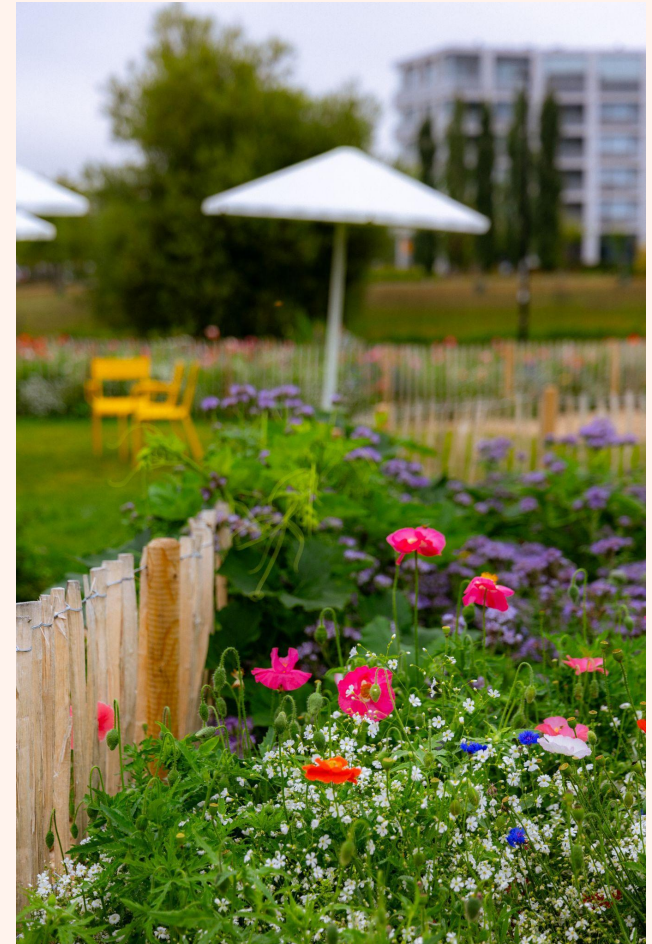
Gathered data

For development, we collect:

- Email address
- IP address
- Number of logins.



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Interested in cooperation with FVH?
Let's have a chat or email me:

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Thank you for your attention

