



USAGE

Urban Data Space
for Green Deal

EGU24-9662



April 19th, 2024

Urban Data Space to Support Green Deal Priority Actions

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F. Noardo⁶, D. Poli⁷, F. Remondino¹, and D. Vandenbroucke⁸

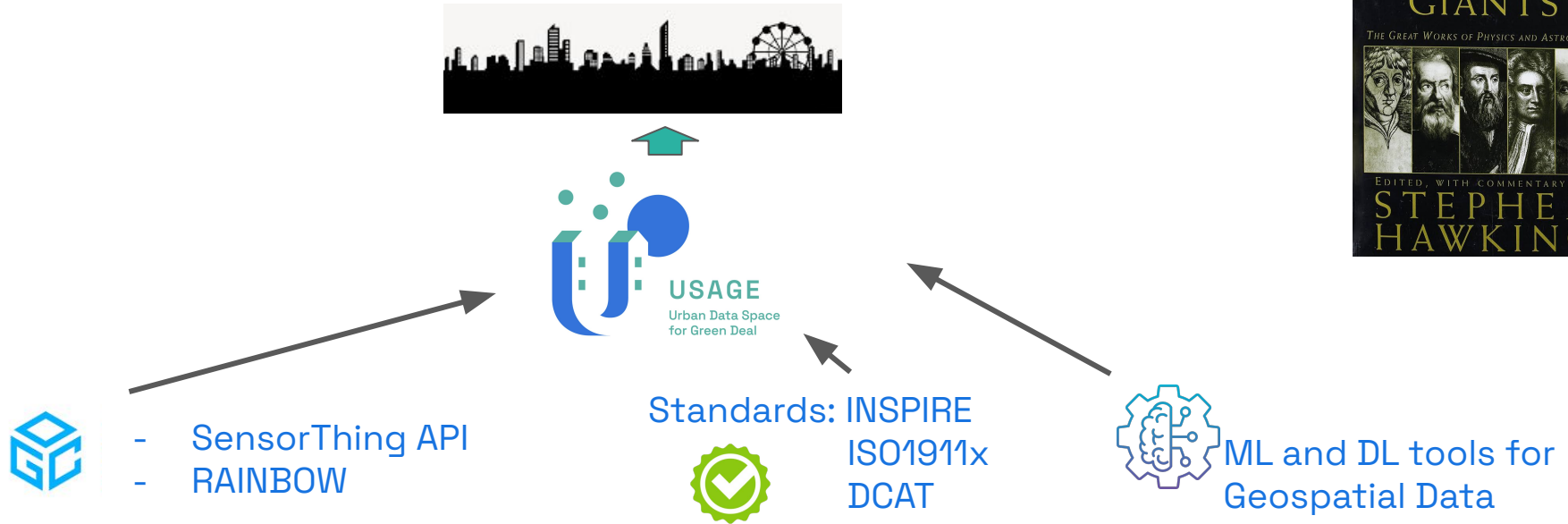
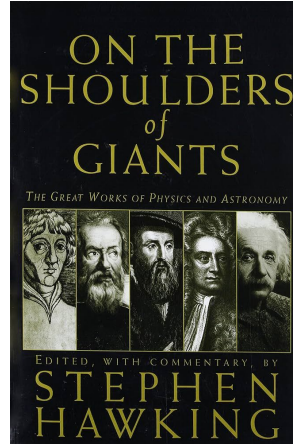
¹FBK, ²Deda Next, ³UPM, ⁴GeoCat, ⁵Epsilon Italia, ⁶OGC, ⁷AVT, ⁸KU Leuven



Co-funded by
the European Union

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a Local Urban Data Space amongst Giants



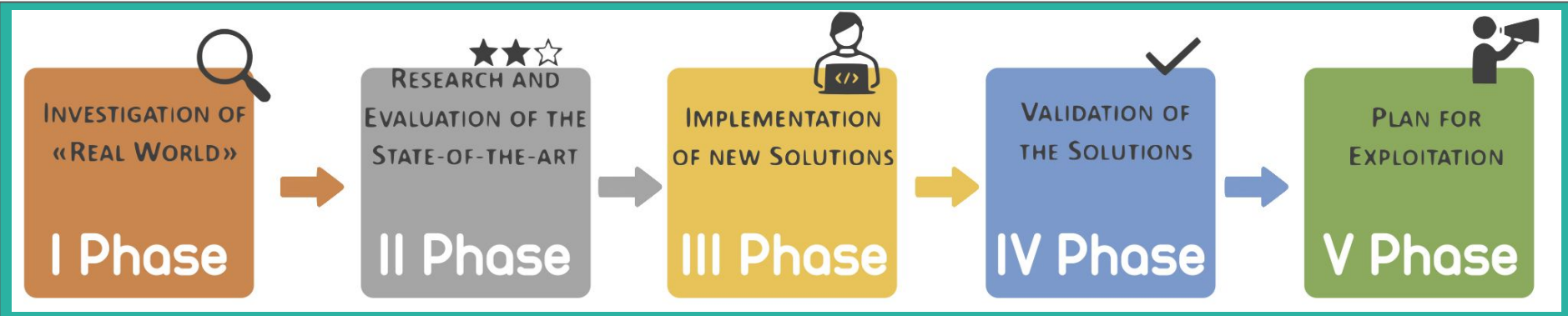
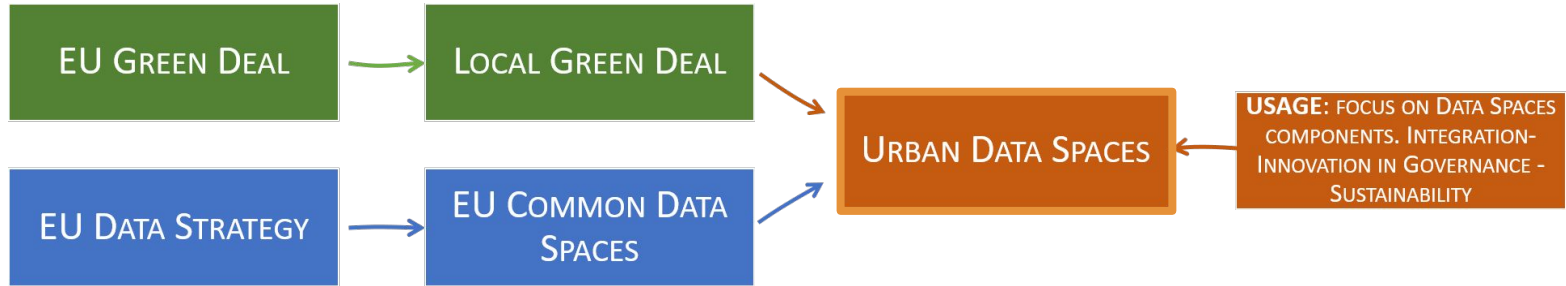
GEOSS
PLATFORM PLUS

Cubes & Clouds

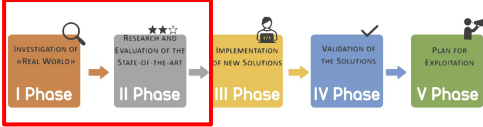
GREAT
Green Deal Data Space

Copernicus
Data Space
Ecosystem

USAGE workflow



4 Pilots across Europe



Ferrara, Italy



Graz, Austria



Zaragoza, Spain



Leuven, Belgium



Phase I & II: Needs identification

Stakeholder engagement

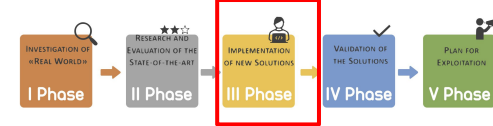


Challenges & needs



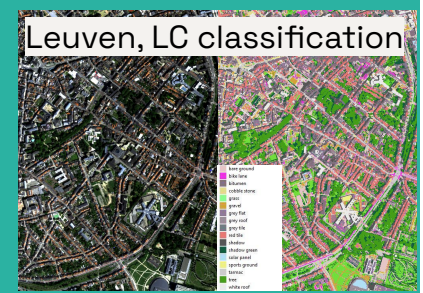
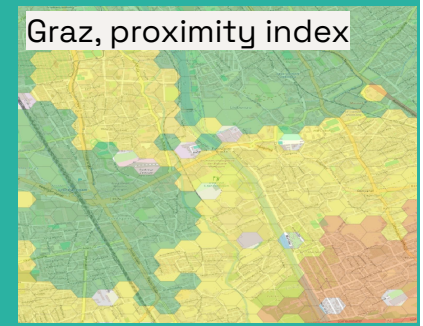
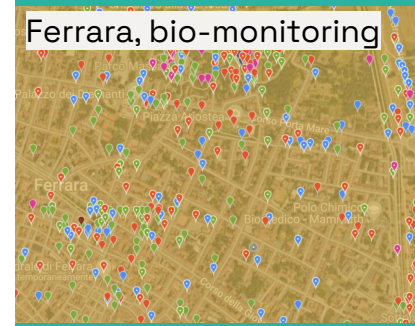
Innovation in data usage

Use cases identified in Phase I & II

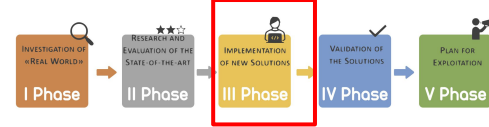


Ferrara, Italy	Graz, Austria
<ul style="list-style-type: none"> Urban Heat Islands Impervious Surfaces Biodiversity Solar energy 	<ul style="list-style-type: none"> Make city data FAIR Optimization of city walk paths
Zaragoza, Spain	Leuven, Belgium
<ul style="list-style-type: none"> Urban Heat Islands Emission inventory 	<ul style="list-style-type: none"> Greening in private areas Extensive green roofs

Phase III: New solutions

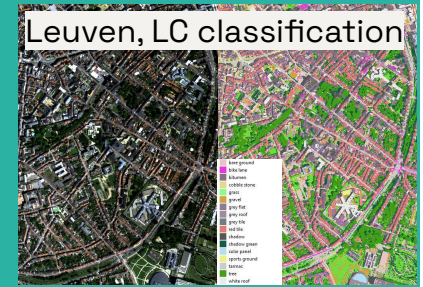
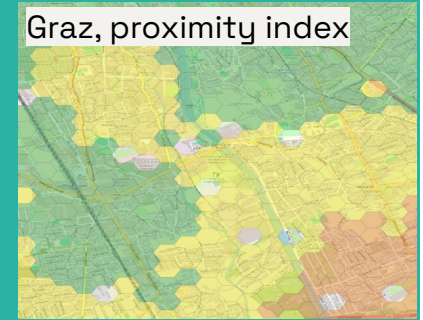
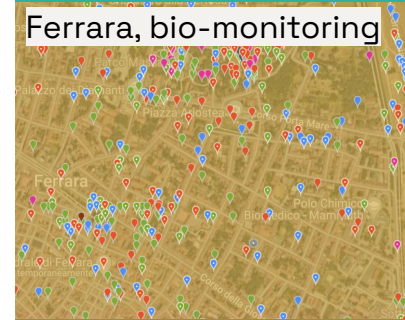


Use cases identified in Phase I & II



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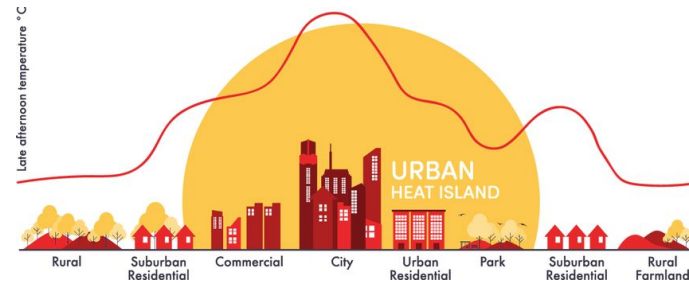
Phase III: New solutions



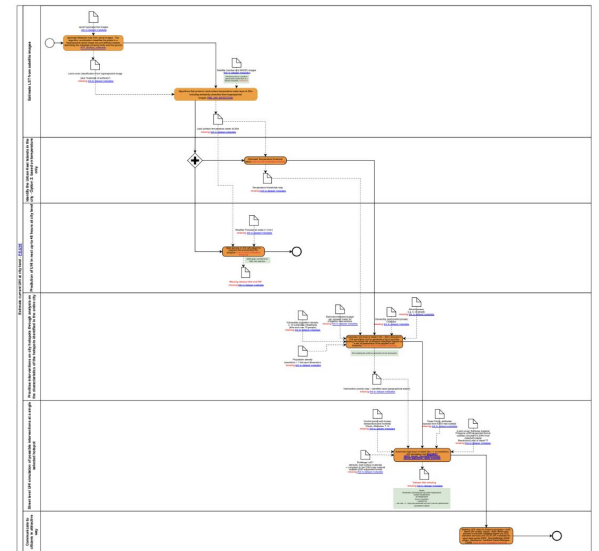
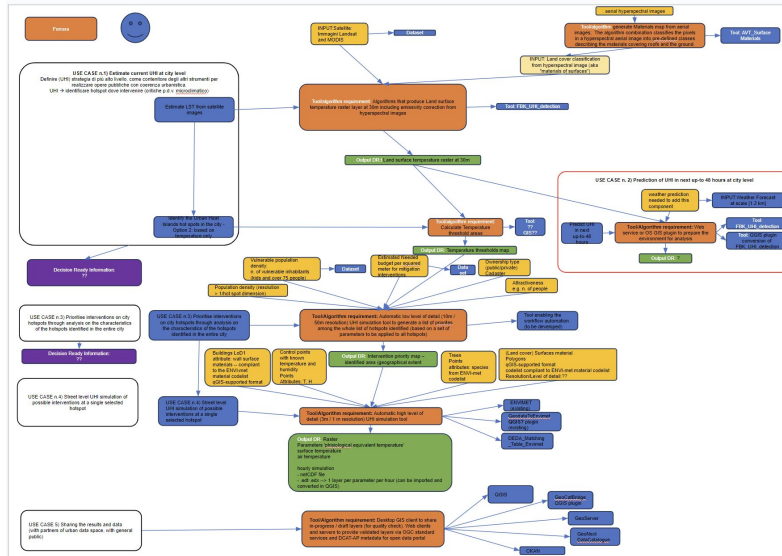
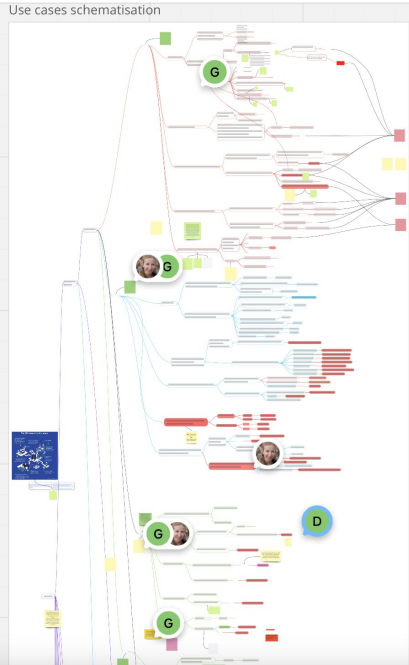
Urban Heat Island Use Case in Ferrara

Brainstorming & initial definition

Analysis, completion and refinement of steps according to specific decision/analysis-ready data requirements



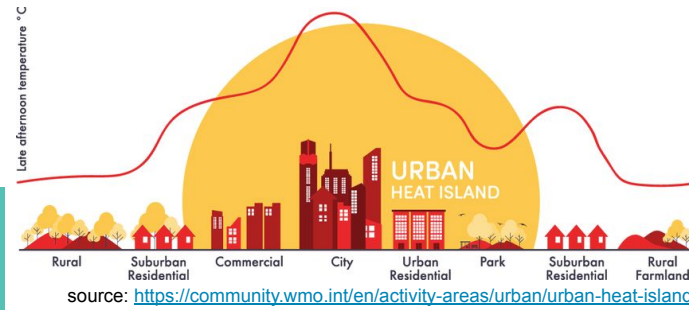
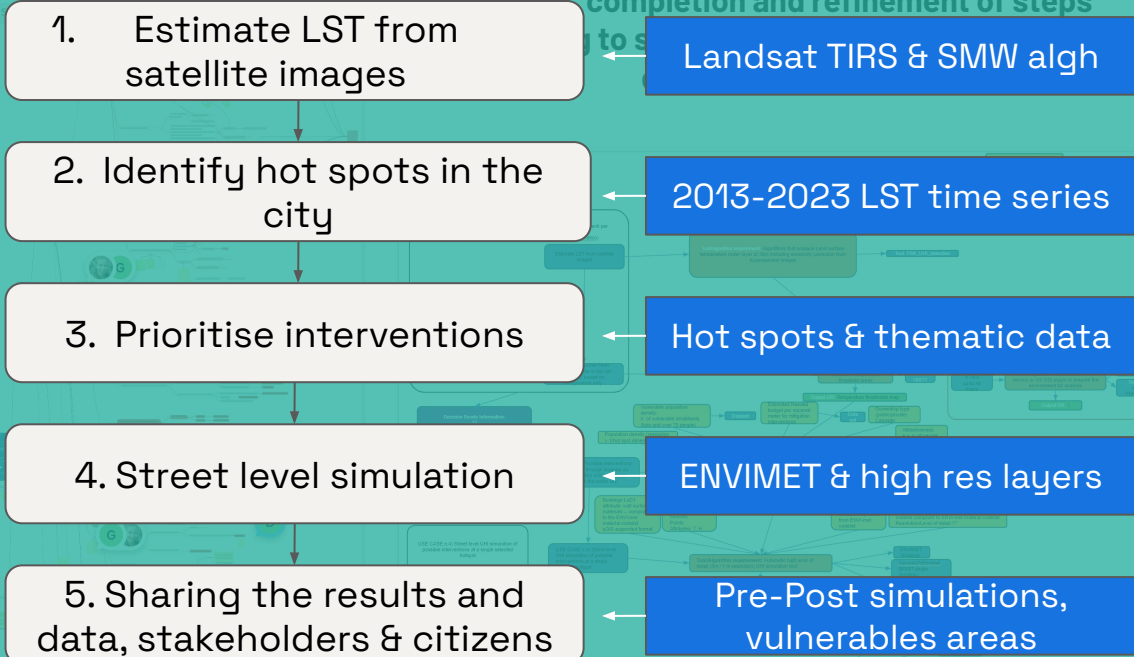
Specification as BPMN maps



Urban Heat Island Use Case in Ferrara

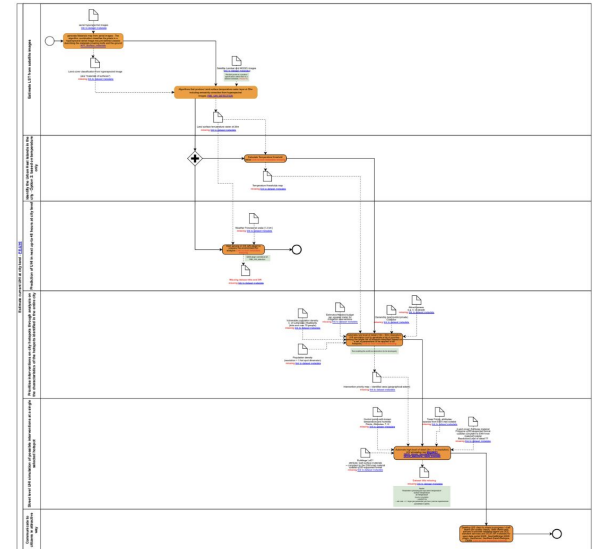
Brainstorming Processing Steps

Identify the Urban Heat Islands hot spots in the city - Option 2: based on temperature only



source: <https://community.wmo.int/en/activity-areas/urban/urban-heat-island>

Specification as BPMN maps



Airborne Remote Sensing



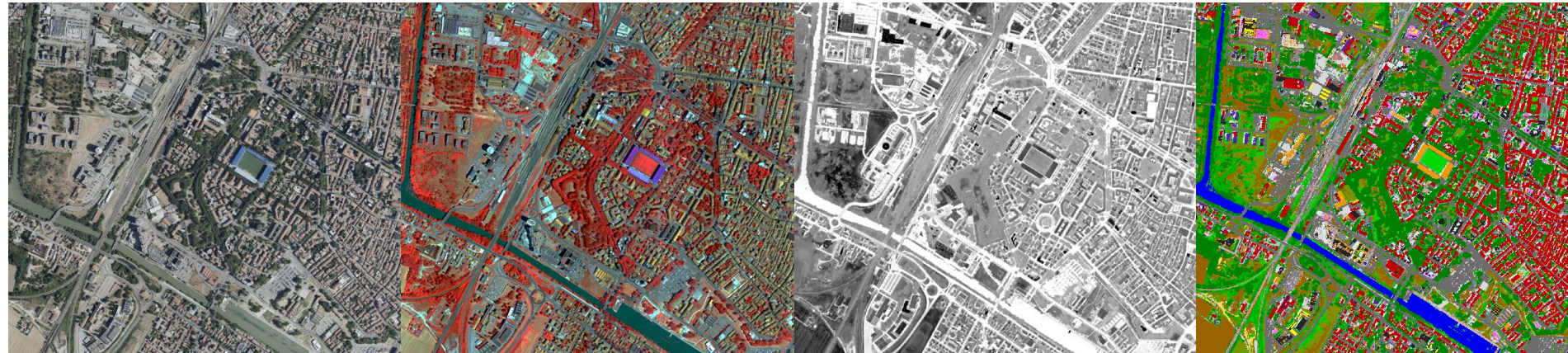
Visible RGB



Thermal
LWIR (7,5 - 14,0 μm)



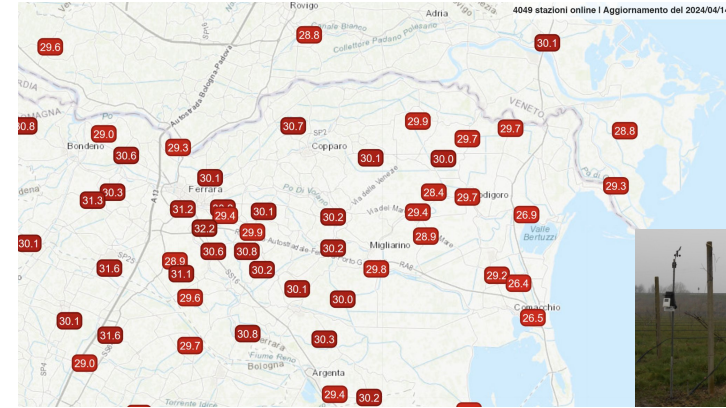
Surface materials from
hyperspectral VNIR-SWIR



Satellite Remote Sensing and IoT

- IoT weather station sensors data are harvested and distributed through FROST-server endpoints
- The decennial capabilities of Landsat 8 platform in thermal imaging are exploited to prioritize intervention within the city.

meteoneetwork RESTful API



April

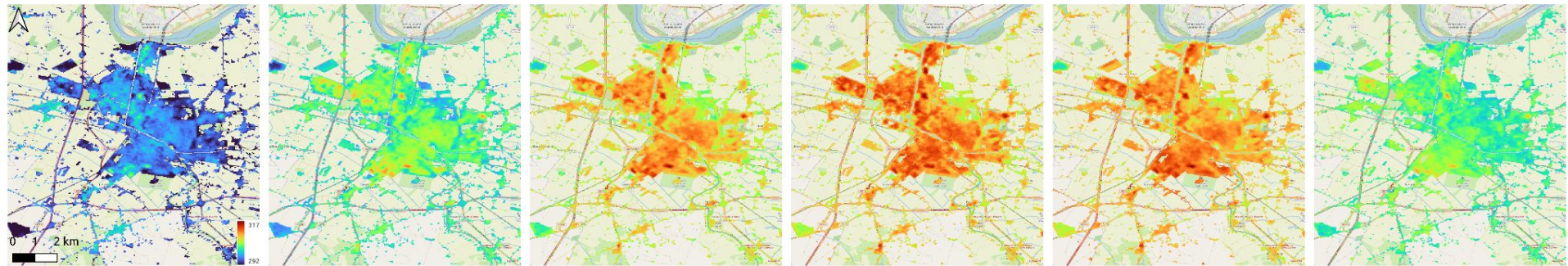
May

June

July

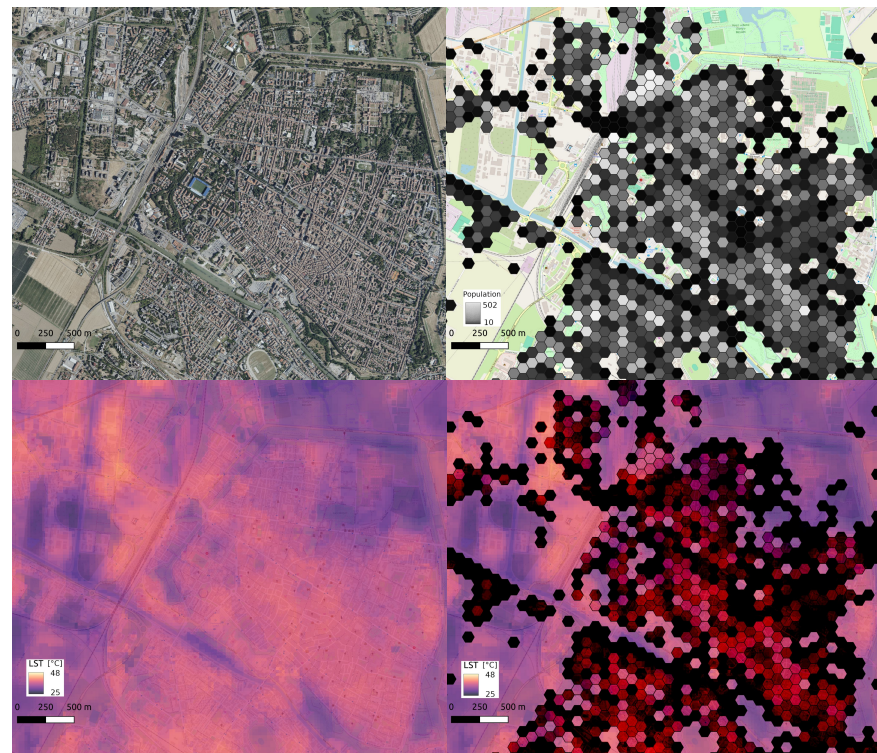
August

September

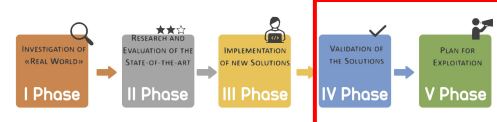


Data Fusion, Analysis Ready Data (ARD) & Decision Ready Information (DRI)

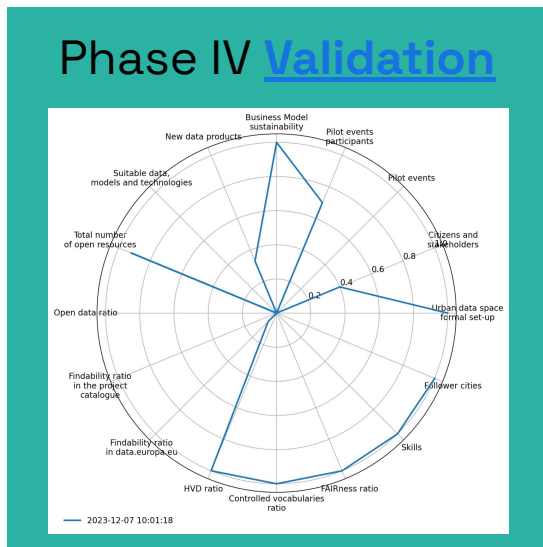
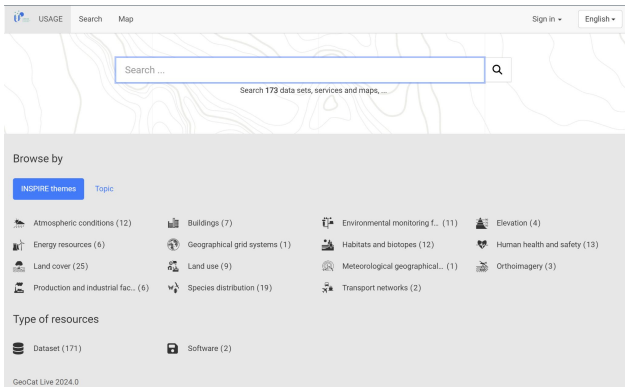
- LiDAR & Hyperspectral >> **Tree species and geometries** (ARD)
- Hyperspectral >> **Surface materials** (ARD)
- Hyperspectral & thermal >> Land surface temperature (**LST**) (ARD)
- Hyperspectral >> **ecological indices** (DRI)
- LST & Population >> **Hazard exposure** (DRI)
- Orthophoto >> Installed **Photovoltaic panels** (DRI)
- LiDAR >> **Photovoltaic Potential** (DRI)
- Citizen Crowdsourced data >> **species richness** (ARD), **flooded areas** (ARD)



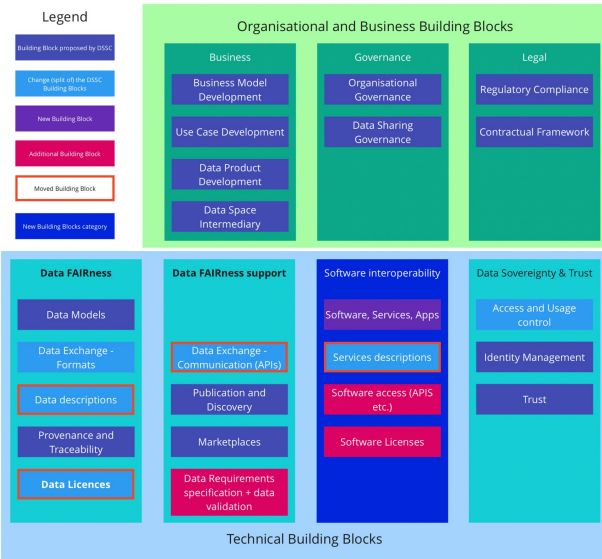
USAGE outcomes ...



<https://usage.geocat.live/>



Re-Discussed Data Space Building Blocks stack, following the mapping to solutions and their scopes



MULTI-MODAL GEOSPATIAL AND THEMATIC DATA TO FOSTER GREEN DEAL APPLICATIONS

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Commission I

KEY WORDS: Photogrammetry, LIDAR, hyperspectral, thermal, mapping, 3D, dataset, Green Deal, climate change

https://github.com/3DOM-FBK/USAGE_Geospatial

Beber et al., EGU24-9662, Urban Data Space to Support Green Deal Priority Actions





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THANK YOU!

www.usage-project.eu



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