



Publishing a Data Paper to share Weather datasets

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UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

AiEM
arquitectura, energia i medi ambient

PhD thesis

The compact city in Mediterranean climate:
Heat Island, Urban Morphology and Sustainability

Joint PhD programme:

Polytechnic University of Catalonia
School of Architecture of Barcelona
PhD in
Architecture, Energy and Environment



Sapienza University of Rome
Civil and Industrial Engineering
PhD in
Engineering-based Architecture and Urban Planning



Supervisors:

Prof. Carlo Cecere (**Sapienza University**)
Prof. Helena Coch Roura (**UPC**)

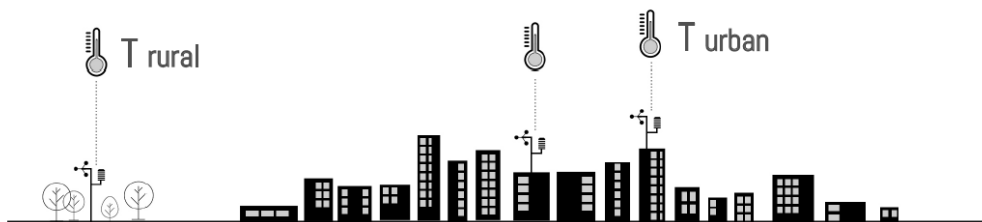
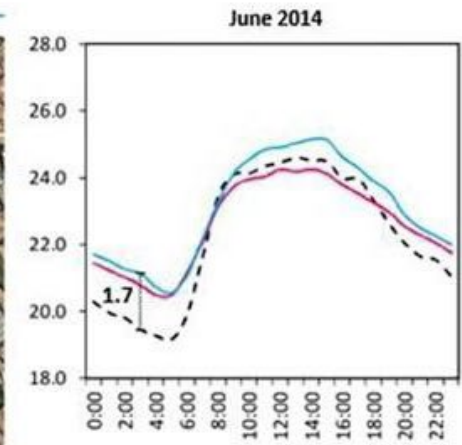
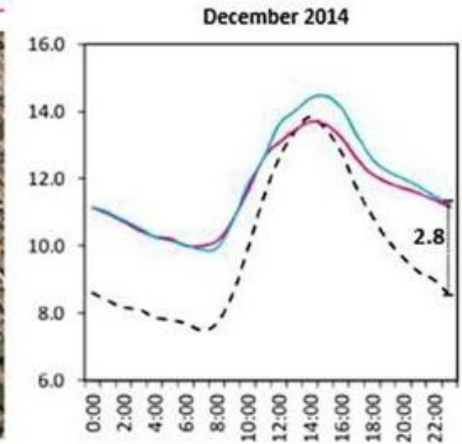
Co-supervisor:

prof. Paolo Monti (Sapienza University)



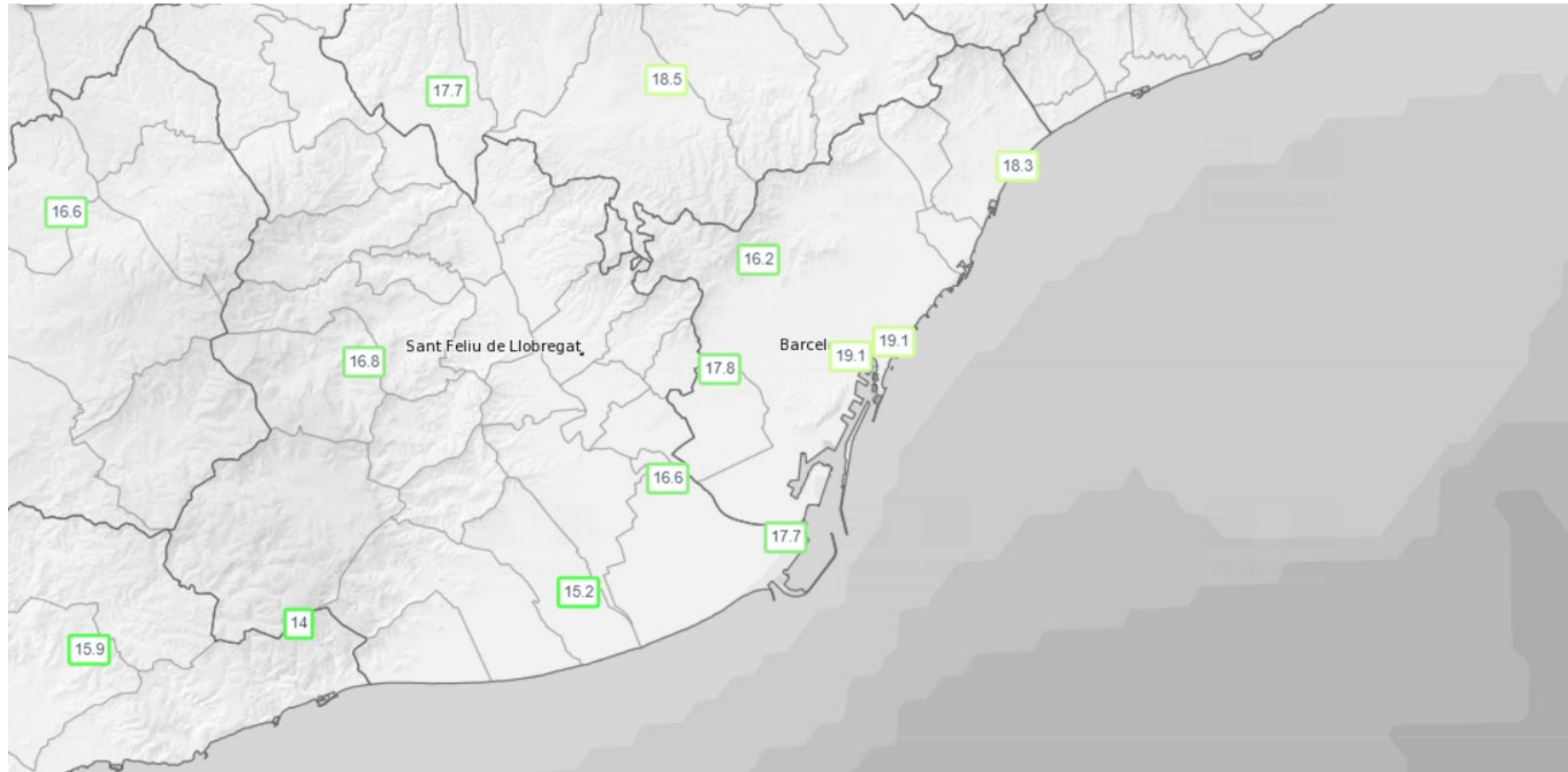
<https://futur.upc.edu/19013190>

Urban Weather data

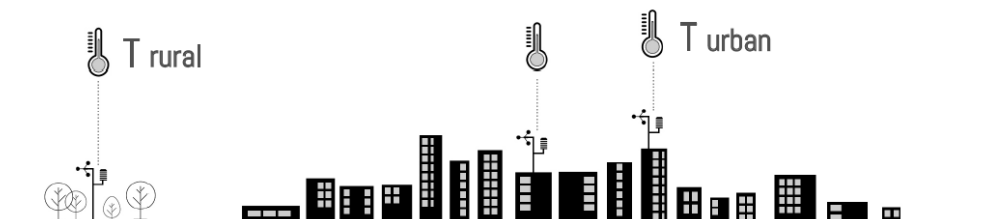


Urban Weather data

Servei Meteorològic de Catalunya (METEOCAT)

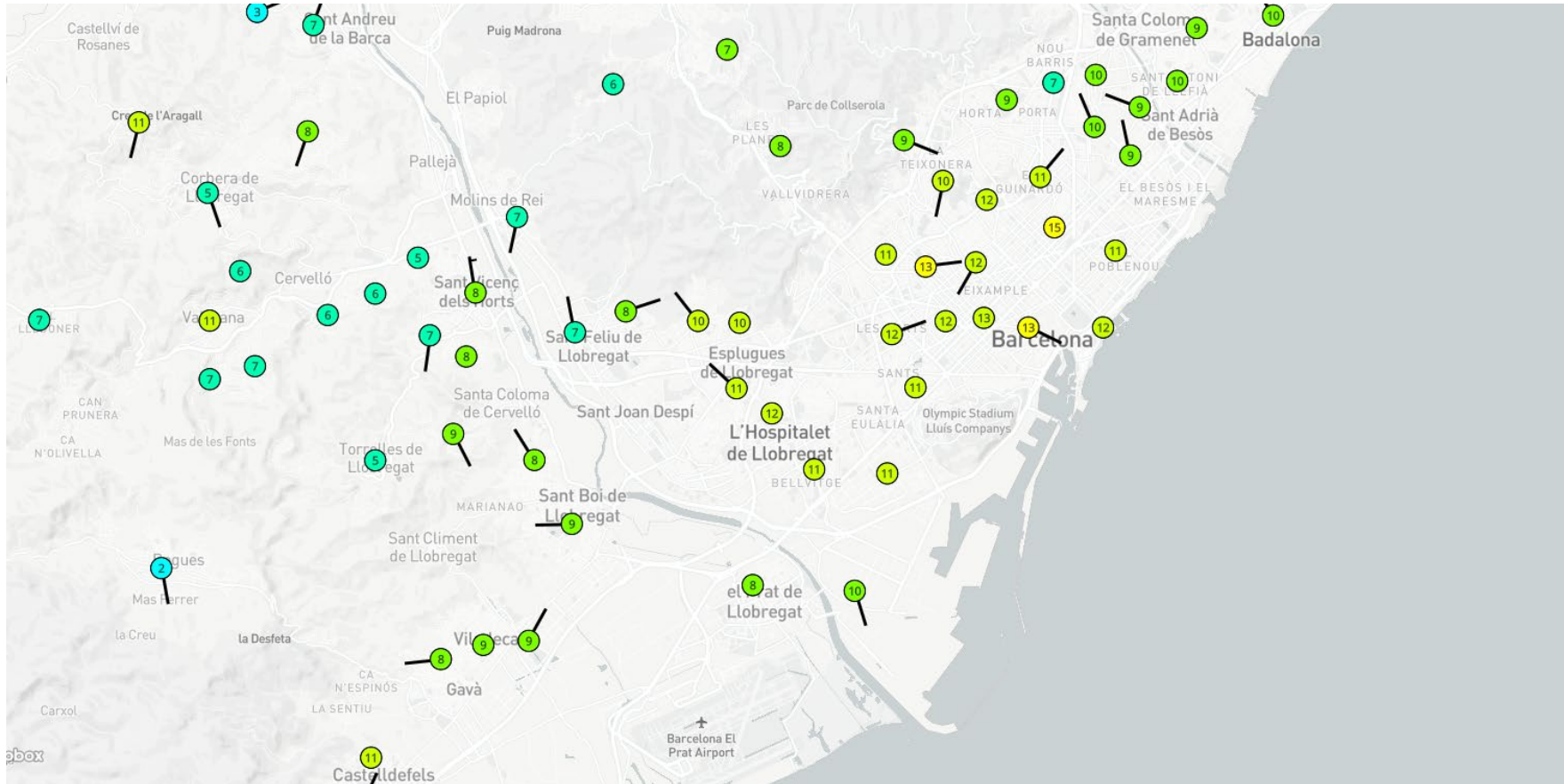


Automatic weather station (XEMA)

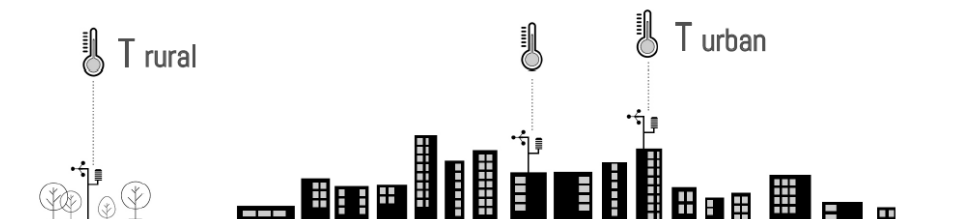


Urban Weather data

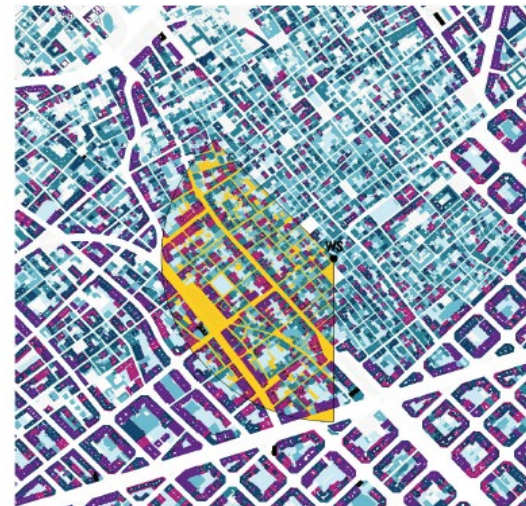
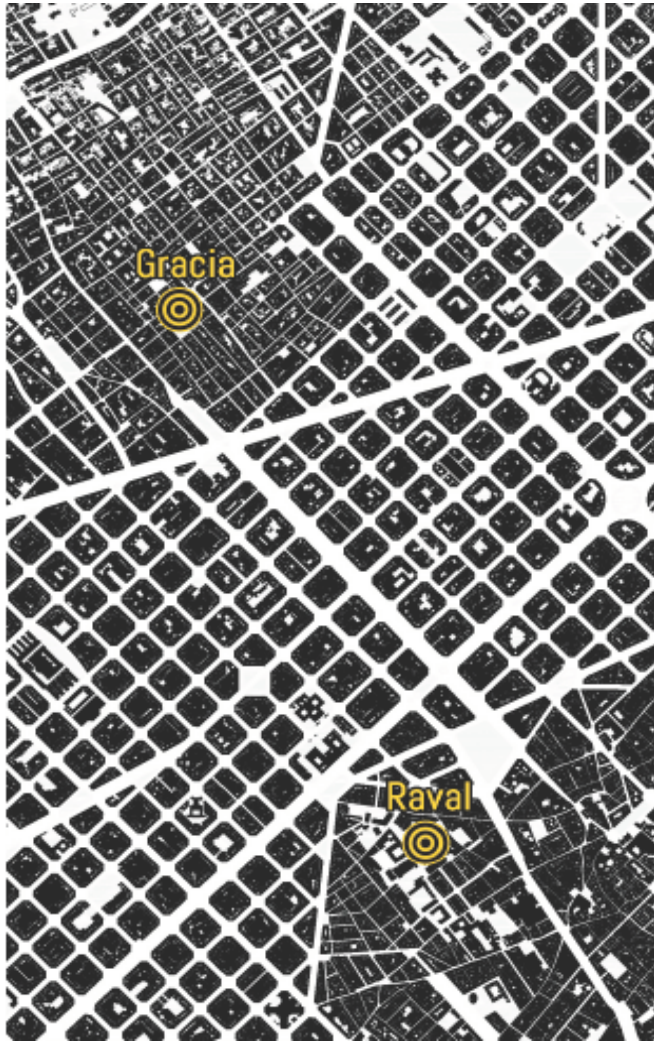
Network of personal weather stations



<https://www.wunderground.com/wundermap>



Urban Morphology and density data

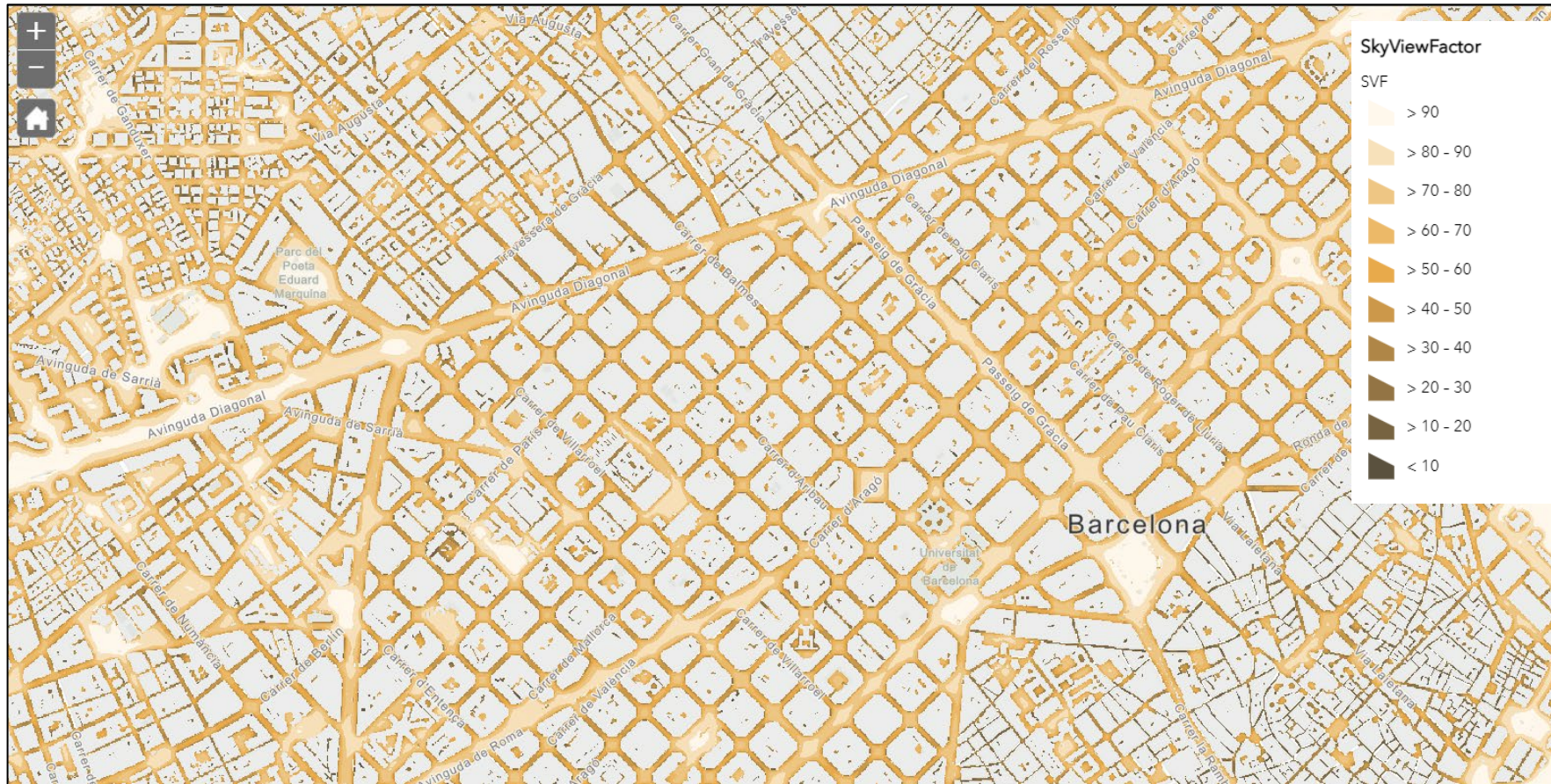


 **AMB** : Àrea Metropolitana de Barcelona
Geoportal de Cartografia

 **icgc.cat**

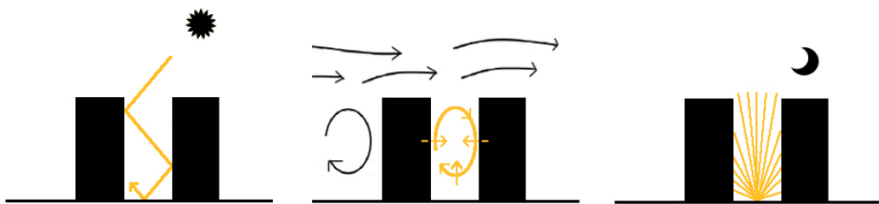
Institut Cartogràfic i Geològic de Catalunya

Urban Morphology and density data

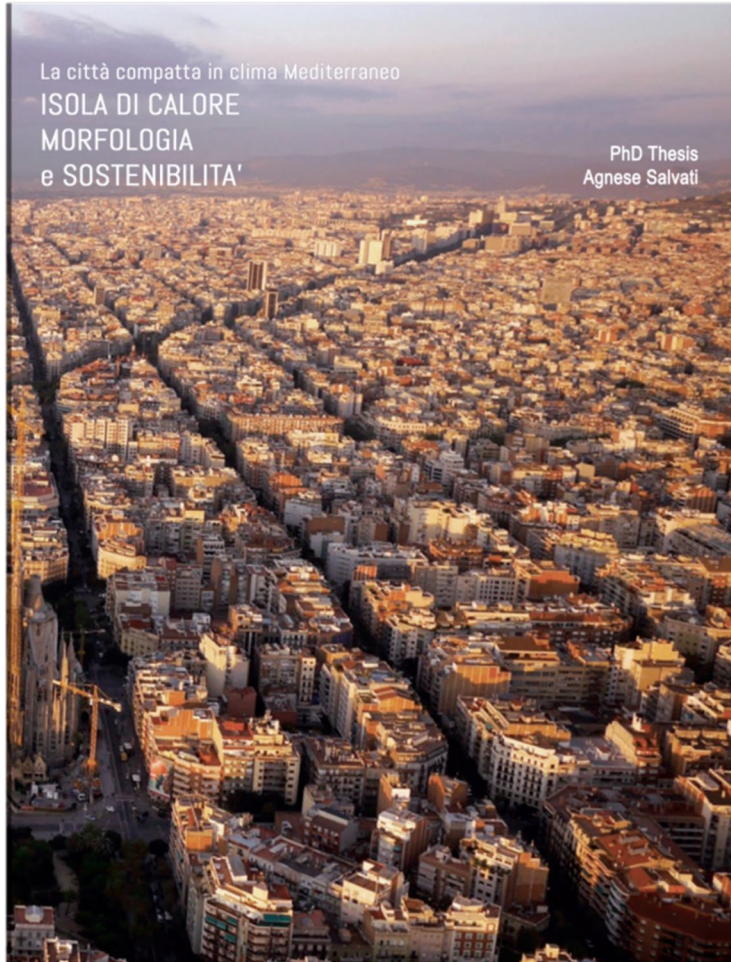


AiEM Sky View Factor
arquitectura, energia i medi ambient

VIMAC



PhD-related Publications



<https://futur.upc.edu/19013190>

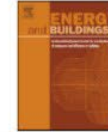
Scientific journal papers from the Phd work



Contents lists available at ScienceDirect

Energy and Buildings

journal homepage: www.elsevier.com/locate/enbuild



<https://futur.upc.edu/20318324>

Assessing the urban heat island and its energy impact on residential buildings in Mediterranean climate: Barcelona case study



Agnese Salvati^{a,*}, Helena Coch Roura^b, Carlo Cecere^a

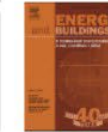
^aSOS.UrbanLab, Faculty of Engineering, DICFA Department, Sapienza University of Rome, Via Eudossiana 18, 00184 Rome, Italy
^bArquitectura, Energia i Medi Ambient, School of Architecture, UPC, Av. Diagonal, 649, 08028 Barcelona, Spain



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Energy & Buildings

journal homepage: www.elsevier.com/locate/enbuild



<https://futur.upc.edu/23662932>

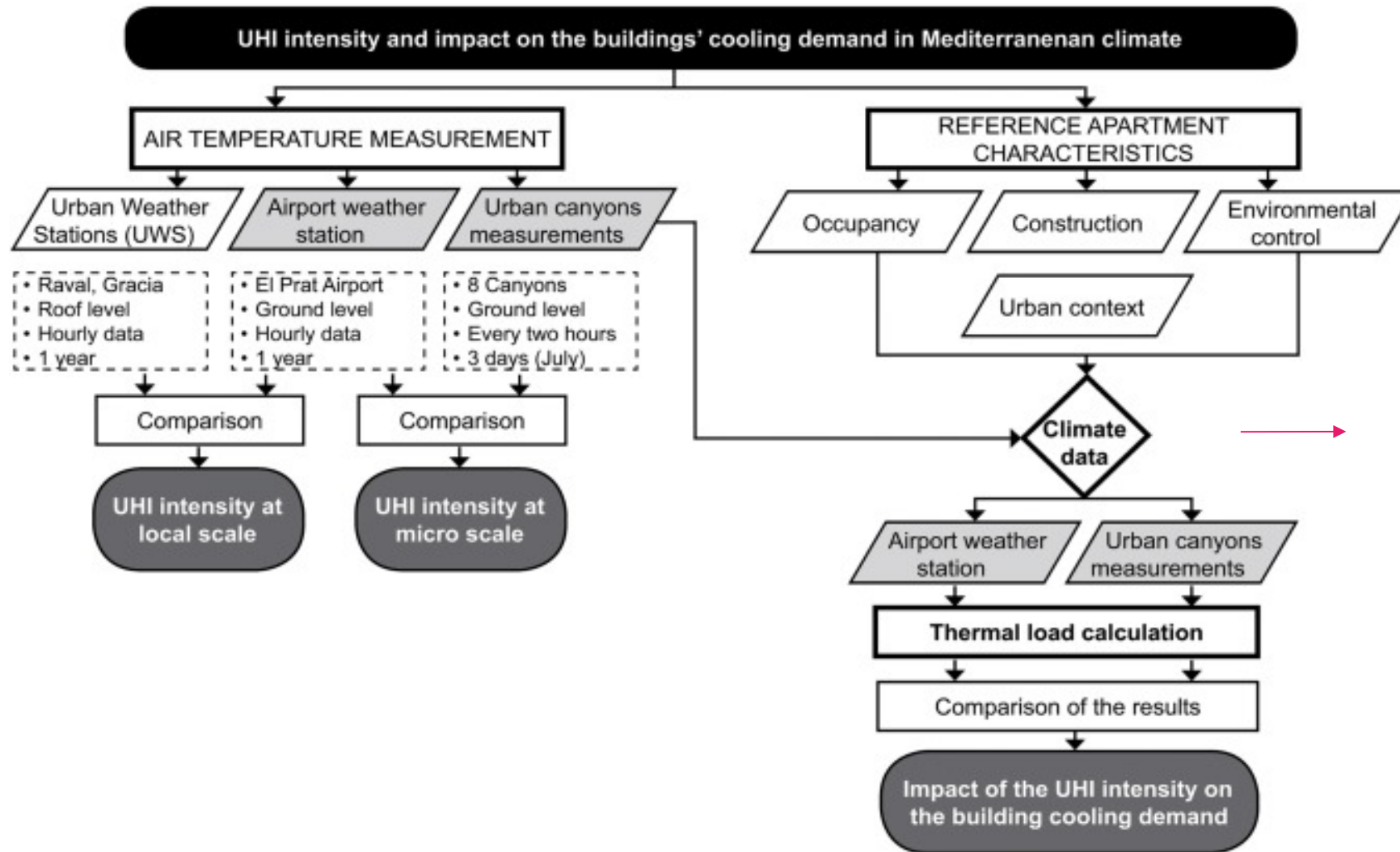
Climatic performance of urban textures: Analysis tools for a Mediterranean urban context



Agnese Salvati^{a,b,*}, Paolo Monti^a, Helena Coch Roura^b, Carlo Cecere^a

^aDICFA Department, SOS Urban Lab, Sapienza University of Rome, Via Eudossiana 18, Rome 00184, Italy
^bSchool of Architecture, AiEM, Polytechnic University of Catalunya, Av. Diagonal, 649, Barcelona 08028, Spain

PhD-related Publications



Energy Plus Weather file (.epw)

Can be published in

DATA PAPER

Data Paper

Open access, **peer-reviewed** article that **describes** and **provide access to research data**.

Support the **FAIR** principles: **F**indability, **A**ccessibility, **I**nteroperability, and **R**euse

- 1) **CREDIT**: Give credit for dataset creation
- 2) **REUSE**: Provide the information needed to interpret, reuse and reproduce data
- 3) **QUALITY**: Focused peer-review evaluates the technical quality of the datasets
- 4) **DISCOVERY**: the data are searchable and discoverable
- 5) **OPEN**: make the data article immediately and freely accessible

Data Descriptors
scientific **data**
nature



ELSEVIER



data



Data Paper

What is needed

1 Select a repository for your data

2 Draft your manuscript *

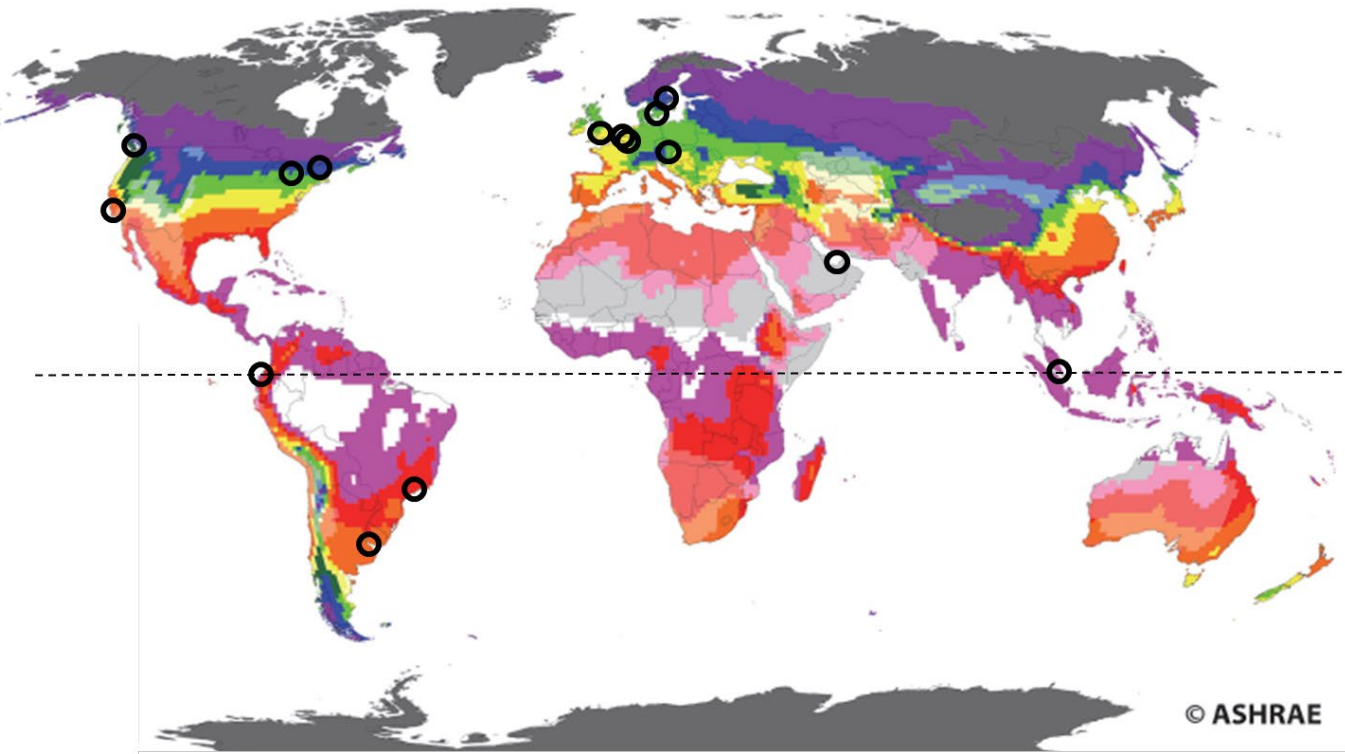
- › Titles & Abstracts
- › Authors & Affiliations
- › Background & Summary
- › Methods
- › Data Records
- › Technical Validation
- › Usage Notes
- › Code Availability
- › Acknowledgements, Author Contributions & Competing Interests
- › References
- › Figures & Tables



* <https://www.nature.com/sdata/publish/submission-guidelines>

Future Weather files to perform simulations

CZ	Description
0A	Extremely Hot Humid
0B	Extremely Hot Dry
1A	Very Hot Humid
1B	Very Hot Dry
2A	Hot Humid
2B	Hot Dry
3A	Warm Humid
3B	Warm Dry
3C	Warm Marine
4A	Mixed Humid
4B	Mixed Dry
4C	Mixed Marine
5A	Cold Humid
5B	Cold Dry
5C	Cool Marine
6A	Cold Humid
6B	Cold Dry



IEA EBC | Annex 80
Resilient cooling of Buildings

Aim: to develop and assess solutions of resilient cooling and overheating protection for **buildings** considering the **impact of climate change**

14 cities in 10 climate zones

Typical meteorological years (.epw):

- Historical (~2010)
- Future : medium term (~2050)
- Future: long term (~2090)

Extreme weather files (.epw):

- Historical (~2010)
- Future : medium term (~2050)
- Future: long term (~2090)

Future Weather files to perform simulations

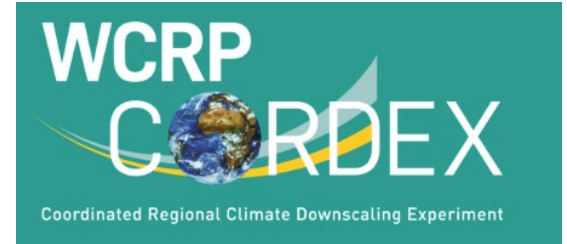
Methods:

1) Collection of data:

- **Climate projections from CORDEX Project**
two periods of 20-years hourly data (6 variables)
- **Observational data**
20 years of historical hourly data (6 variables)

2) Creating typical meteorological years from multi-years hourly datasets

3) Selecting extreme heatwaves from multi-year datasets



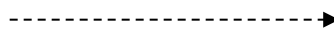
Technical Validation

Bias correction of climate model simulations

Data records:

Links to the data repositories

Explains the data files and their formats



0A Singapore

- 0A_Singapore_TMY_2001-2020.epw
- 0A_Singapore_TMY_2041-2060.epw
- 0A_Singapore_TMY_2081-2100.epw

0B Abu Dhabi

- 0B_Abu_Dhabi_TMY_2001-2020.epw
- 0B_Abu_Dhabi_TMY_2041-2060.epw
- 0B_Abu_Dhabi_TMY_2081-2100.epw

4A London

- 4A_London_TMY_2001-2020.epw
- 4A_London_TMY_2041-2060.epw
- 4A_London_TMY_2081-2100.epw

4C Vancouver

- 4C_Vancouver_TMY_2001-2020.epw
- 4C_Vancouver_TMY_2041-2060.epw
- 4C_Vancouver_TMY_2081-2100.epw



Thanks!

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