Overview del Progetto LIFE ASTI

DEPLAZIO Rome, 19 October 2021

The project *Implementation of a forecAsting System for urban heaT Island effect for the development of urban adaptation strategies - LIFE ASTI* has received funding from the LIFE Programme of the European Union.

LIFE Climate Change Adaptation
Urban adaptation/planning

ASTI (Implementation of a forec**A**sting **S**ystem for urban hea**T** **I**sland effect for the development of urban adaptation strategies)

Index

- **Introduction**
- **Objectives**
- **LIFE ASTI partnership**
- **LIFE ASTI progress**

Introduction

An urbanizing world: Key facts

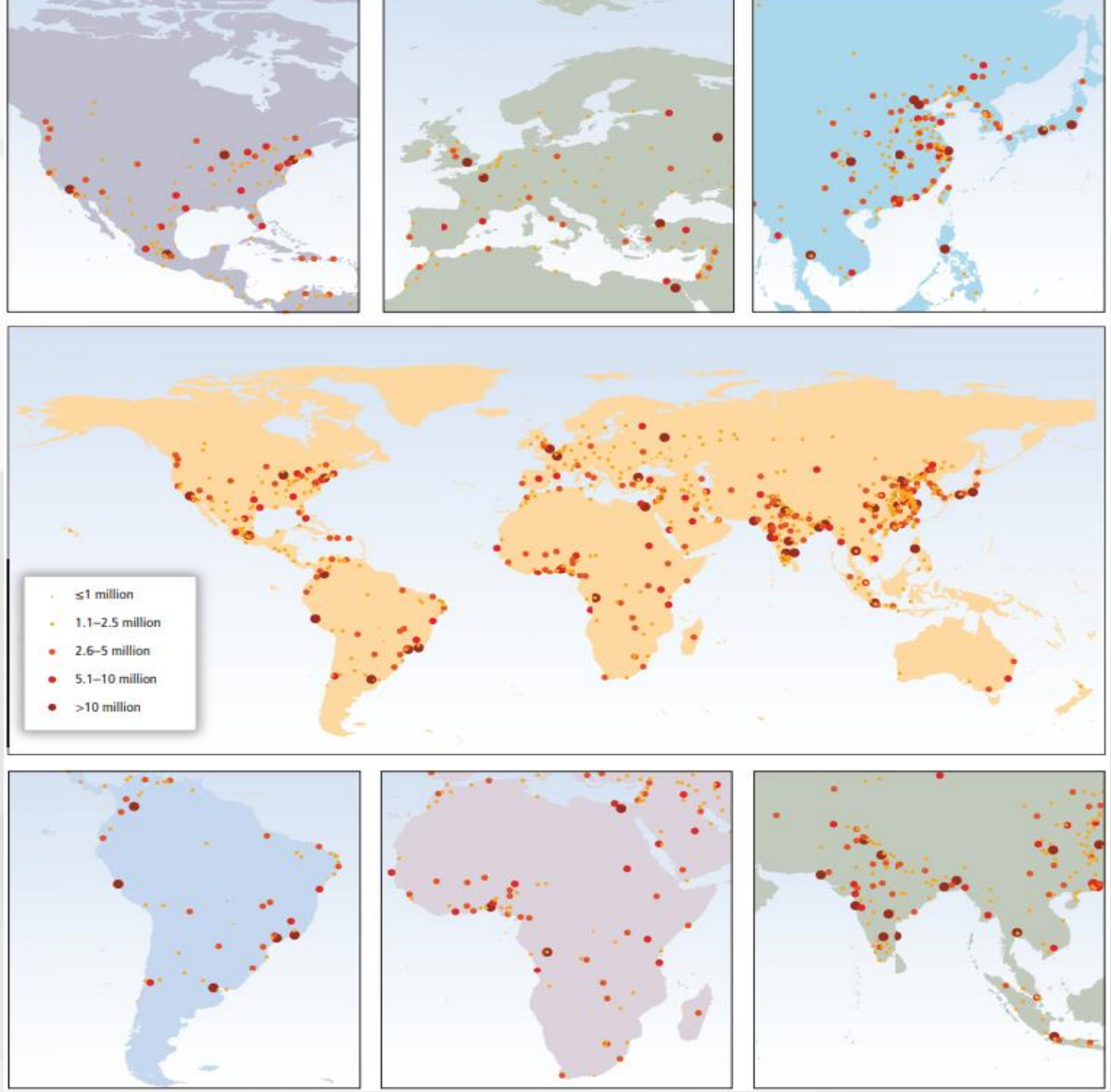
- ✓ Global urban population in 1950: 751 **million**
  Global urban population in 2018: 4.2 **billion**

India, China and Nigeria will account for 35% of the growth of the world's urban population between 2018 and 2050

- ✓ Urban populations:
  - Northern America 82 %
  - Latin America and the Caribbean 81 %
  - Europe 74 %
- ✓ By 2030 the world is projected to have **43 megacities**.

Introduction

1950: 30% of the population was urban
2018: 55%
2050: 68%

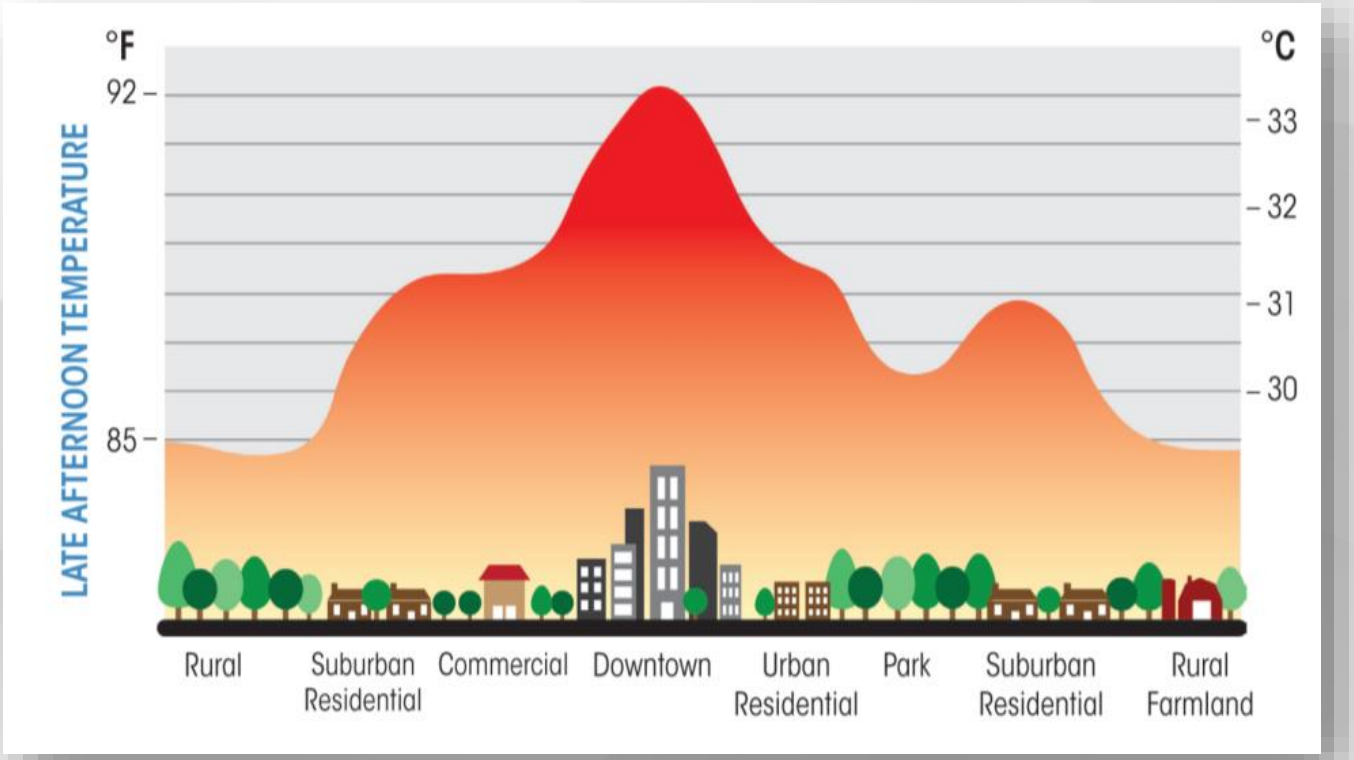


Global and regional maps showing the location of urban agglomerations with 750,000-plus inhabitants in 1950/2025 (derived from statistics of DESA (Department of Economic and Social Affairs) Population Division, 2012)

The Urban Heat Island effect (UHI)

Urban Heat Island

Temperature contrast between a city and its rural surroundings



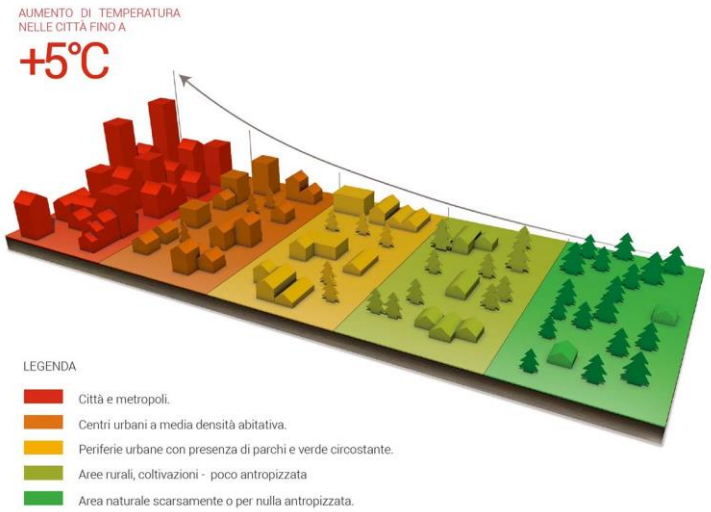
UHI can be **attributed to** …

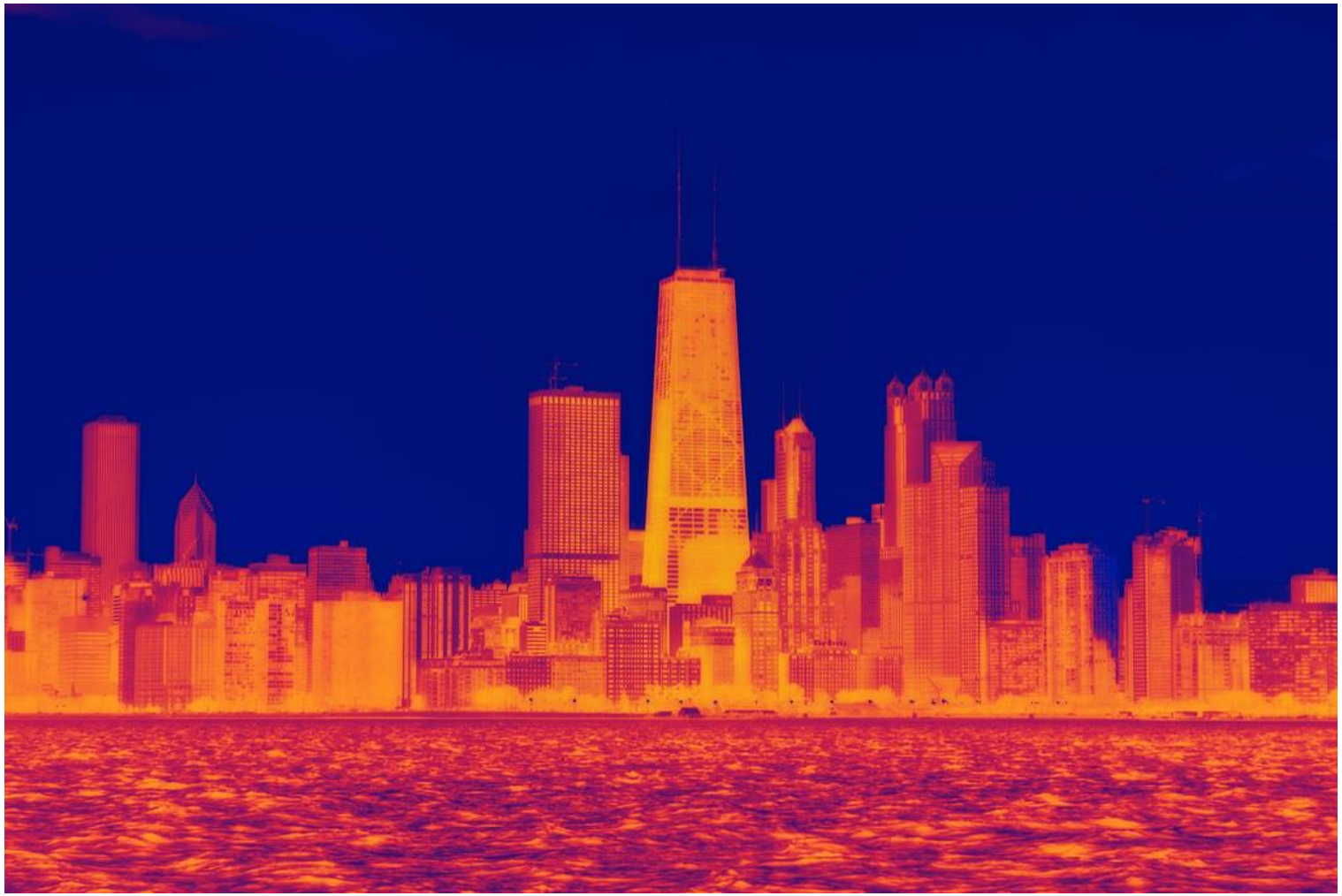
- Anthropogenic heat release
- Geometric impact of buildings
- Thermal properties of urban surfaces
- Absence of vegetation

Interaction of **controllable** (i.e. anthropogenic heat) and **uncontrollable** (i.e. solar radiation) factors

Typical infrared image of a city

THE BUILDING ENVELOPE DETERMINE THE LEVELS OF COMFORT



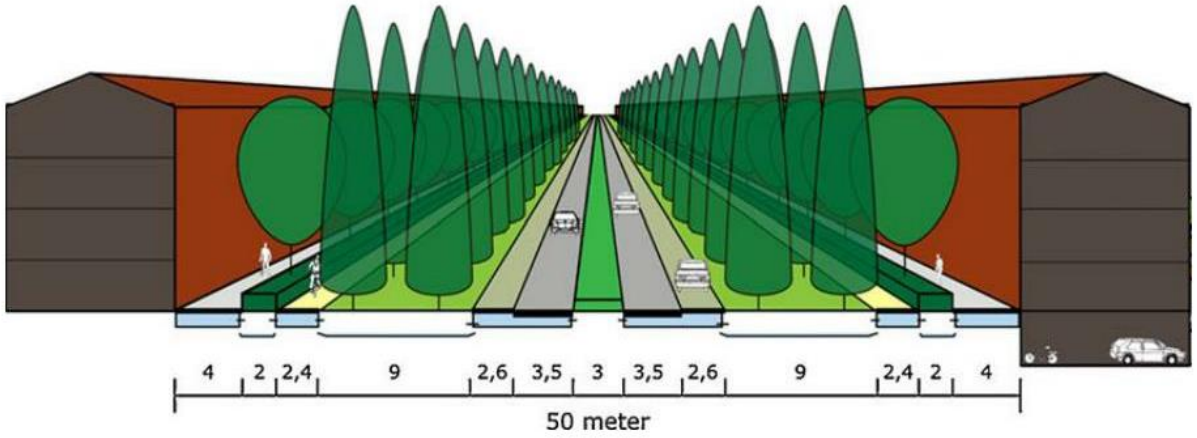


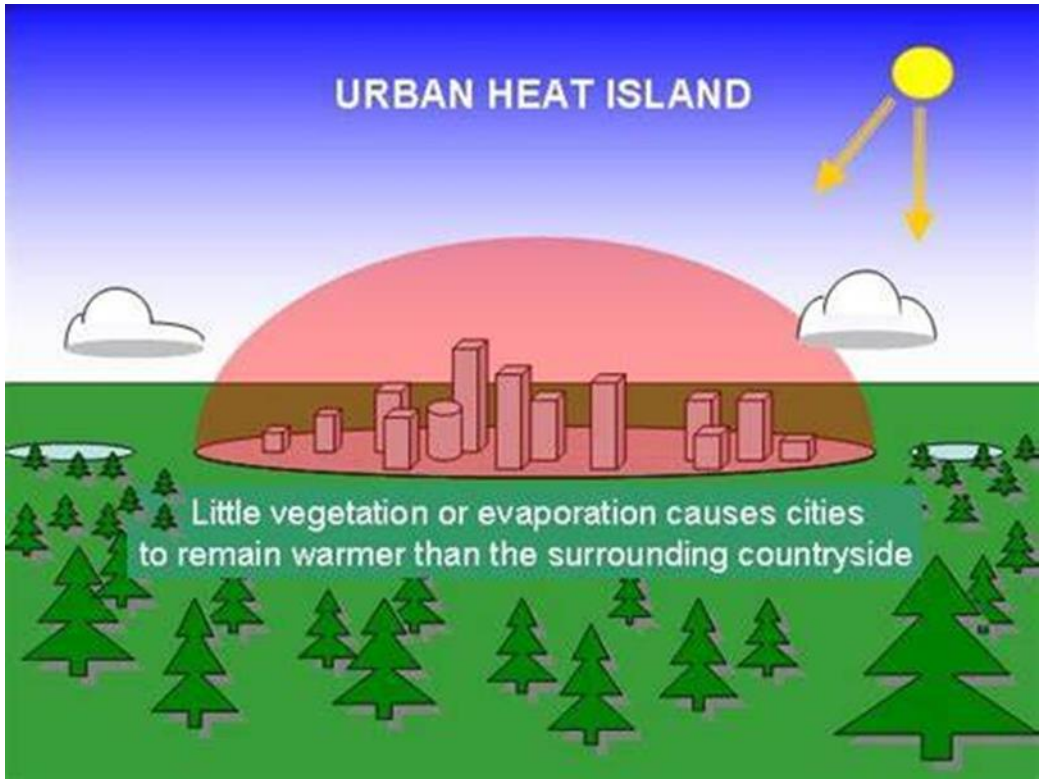
In mitigating urban heat island, building envelope requires improvement towards a concept that radiates less heat – A Cool Building Envelope.

The strentgh uf the UHI is related to the city characteristics and meteorology factors

The Urban Heat Island: cures?

- White roofs
- Cool pavement
- Green roofs
- Street trees [λE]





Consequences of UHI

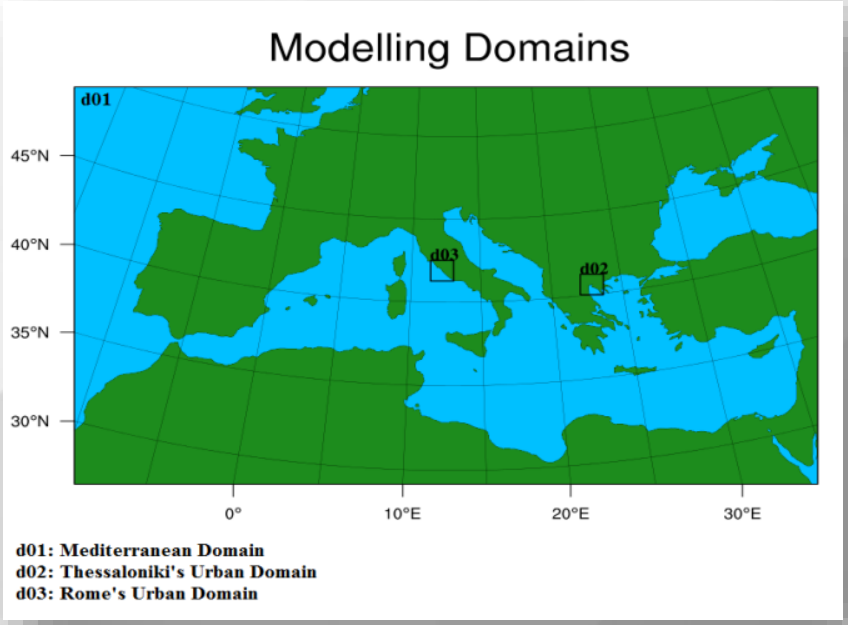
A living environment that is significantly degraded

i. Increased thermal stress on residents
ii. The formation of large amounts of smog and air pollutants, and a resulting degradation in the quality of air
iii. Increased cooling energy usage and associated costs
iv. Significant increases in peak energy demand
v. Strong impact on urban ecosystems
vi. A significantly increased level and risk of morbidity and mortality due to heat

LIFE ASTI partnership

Location: Thessaloniki and Heraklion , Greece

\+ Rome, Italy



- **Partners:**

Aristotle University of Thessaloniki, Greece (coordinator)

Azienda Sanitaria Locale Roma 1, Italy

Geospatial Enabling Technologies Ltd., Greece

Institute of Atmospheric Sciences and Climate, National Research Council of Italy, Italy

Municipality of Thessaloniki, Greece

Sympraxis Team P.C., Greece

Objectives of LIFE ASTI

The primary objective of the project is to **develop** and **implement** **short-term adaptation** **and** **long-term mitigation tools** to counteract the Urban Heat Island (UHI) effect **and its heat-health impacts in Thessaloniki and Rome**

Specific objectives

- To implement UHI forecasting systems for Thessaloniki and Rome based on state-of-the-art numerical models;

- To assess the impact of future climate change scenarios on UHI for the two selected cities;

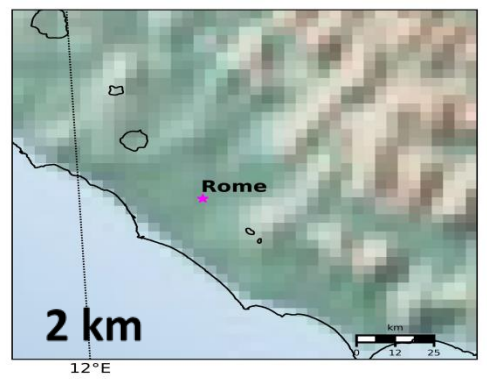
- To evaluate the impact of promoting green activities in urban areas to combat the UHI effect;

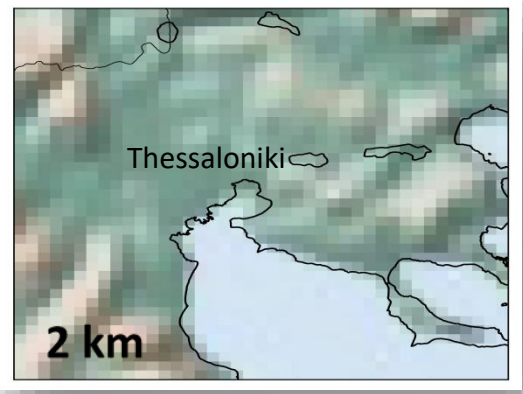
Specific objectives

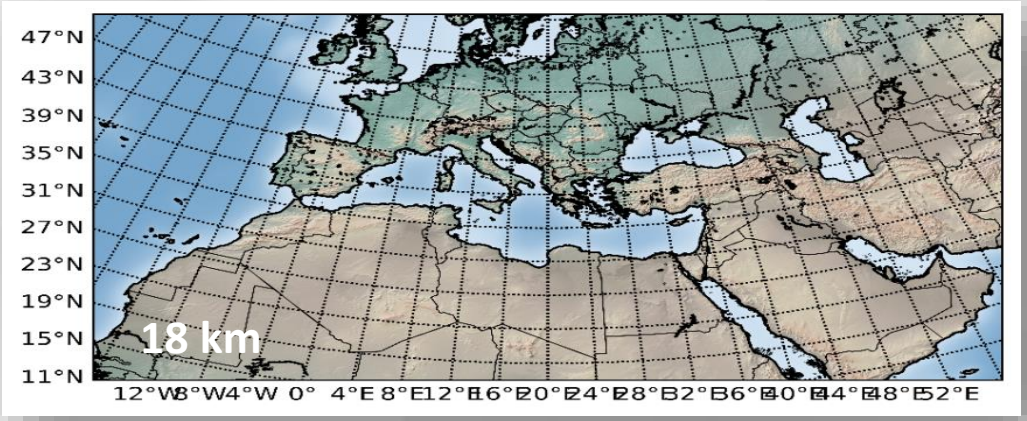
- To develop good practice guides and efficient strategic plans for mitigating future UHI effects in the involved cities;
- To raise awareness and encourage authorities to apply the above urban adaptation strategies and mitigation initiatives;
- To organize events to promote, replicate and transfer the designed modeling systems and the best urban adaptation strategies to other European cities.

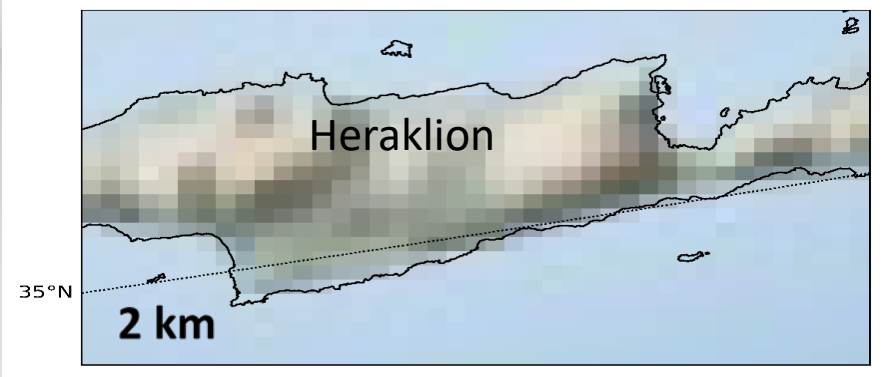
LIFE ASTI study areas

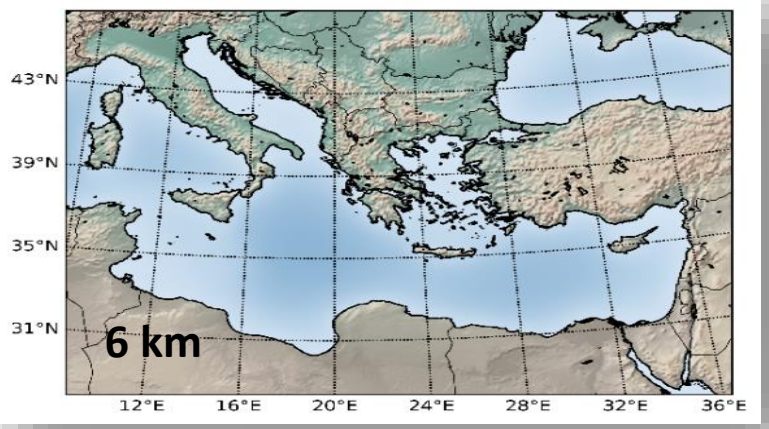
High resolution WRF simulations (6 km over Mediterranean area and 2 km over Thessaloniki, Heraklion and Rome)



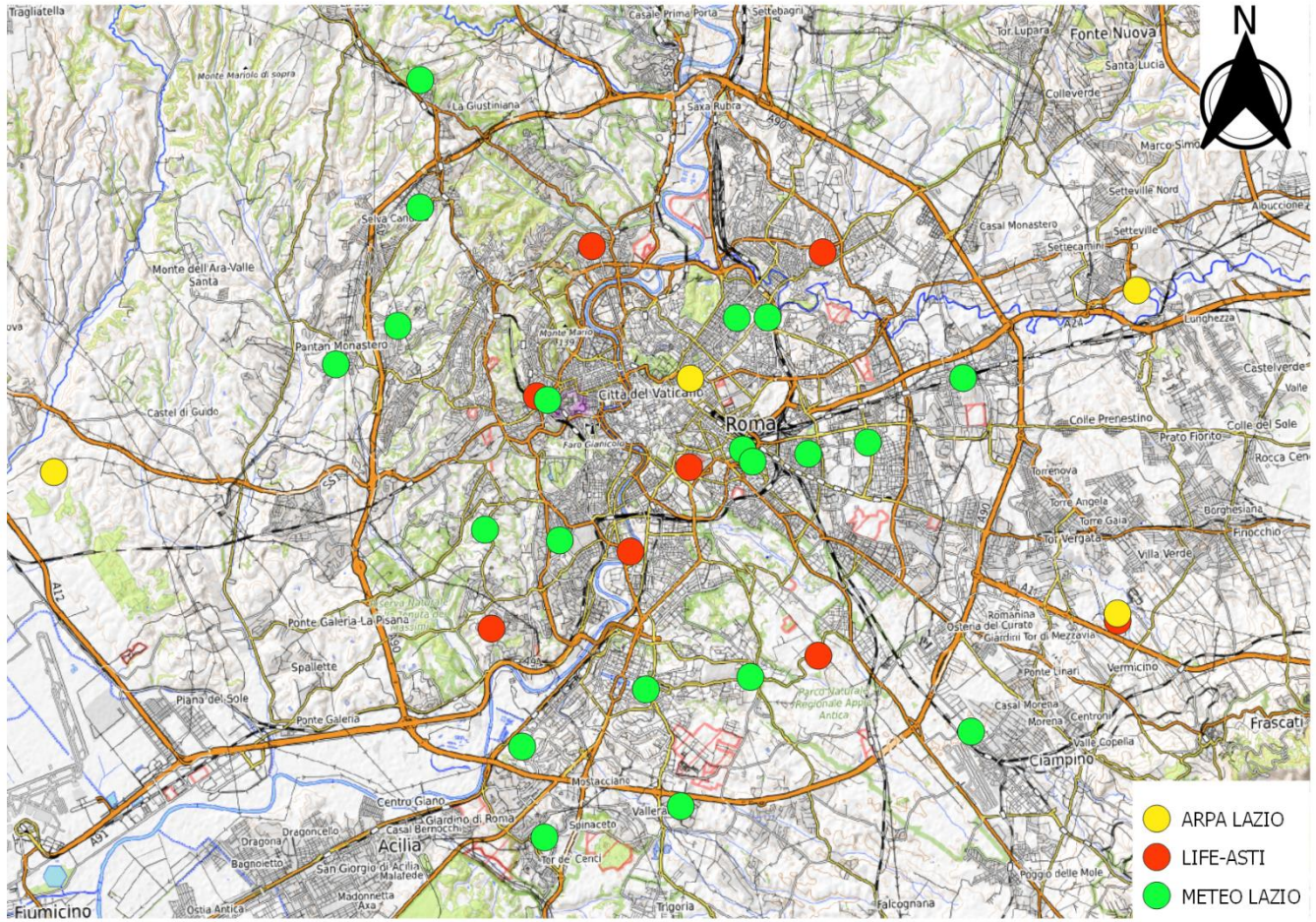








Installation of supplementary weather stations



Arpa Lazio 4 stations (yellow)
ASTI 8 stations (red)
Meteo Lazio 21 stations (green)

https://www.meteoregionelazio.it/asti-network/mappa.php

https://www.meteoregionelazio.it/asti-network/tabella_stazioni.html

Thank you for your attention

The project *Implementation of a forecAsting System for urban heaT Island effect for the development of urban adaptation strategies - LIFE ASTI* has received funding from the LIFE Programme of the European Union.