

# CLIMATE ADAPTATION STRATEGY

Roma Capitale first climate  
monitoring report

Synthesis



The **climate monitoring** of the Municipality of Rome is the result of the technical-scientific collaboration between Roma Capitale and the CMCC Foundation.

This synergy has led to the drafting of this report and the creation of an interactive service accessible on Dataclime, a platform managed by the CMCC, accessible after free registration.



## Authors

Paola Mercogliano, Alfredo Reder, Giuliana Barbato, Alessandro Bonfiglio, Giuseppe Giugliano, Davide Dansero, Mattia Scalas, Antonella Mele, Arianna Acierno

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ROMA





# Monitoring to adapt: a climate resilience tool for Rome's future

Rome's first Climate Adaptation Strategy, approved by the Capitoline Assembly on 14 January 2025, identified priorities, objectives and measures to prepare the city for the scenario of impacts already underway and those that may intensify as a consequence of global warming processes. The document includes contributions by all main scientific and research bodies, aiming to reconstruct the current impacts and risks to the territory of Rome, climate weather data and the assessment of future climate change scenarios.

The strategy identifies **four main priorities to be addressed**: heavy rainfall and flooding that put neighbourhoods and infrastructure at risk; security of water supplies in a scenario of reduced rainfall and longer periods of drought; adaptation of neighbourhoods to rising temperatures with consequences for people's health; and the impacts on the coastline caused by erosion processes and increasingly violent rainfall and whirlwind, in a scenario of rising sea levels.

To meet these challenges, the strategy identifies objectives and adaptation measures that are indispensable in addressing current and foreseeable impacts based on climate scenarios to 2050.

One of the most important measures to accompany the strategy's implementation pathway is the creation of a **monitoring system** with the objective of understanding the evolution of ongoing processes through the identification of a series of climate indicators - in line with the National Plan for Adaptation to Climate Change (PNACC) - and to define a climate profiling that can support adaptation actions and assess their effectiveness and how they can be further implemented.

The first Rome climate monitoring is the result of the technical and scientific collaboration between Roma Capitale and the CMCC Foundation (Euro- Mediterranean Centre on Climate Change), with the aim of supporting the Municipality in the development of effective tools to face the challenges of adaptation to climate change in the urban environment.

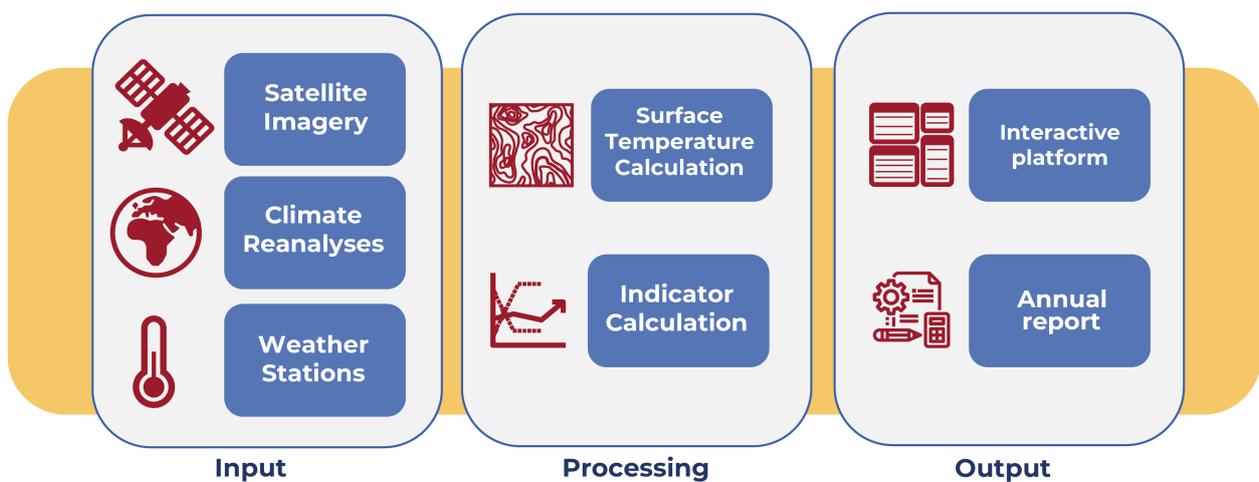
The initiative can be framed within the context of the **RAST - Regional Adaptation Support Tool**, promoted by the EU Mission on Climate Change Adaptation.

In particular, it aligns with the sixth phase of the RAST pathway, dedicated to the monitoring and evaluation of the actions undertaken, to ensure consistency with the strategic objectives and to verify the effectiveness of the measures adopted.

A central element of the initiative is the use of **Dataclime**, a platform developed by the CMCC, to make climate data accessible and understandable. The platform allows an **interactive monitoring** of the most relevant climate indicators of the adaptation strategy of Roma Capitale, and to identify the most vulnerable areas, such as those subject to urban heat islands.

The platform integrates different data sources: **weather stations** providing observed data, **climate model data** processed by the CMCC Foundation and **satellite data**. The multiplicity of integrated sources allows a solid and reliable reading of the urban territory for the planning and monitoring of future climate adaptation interventions by the Municipality of Rome and other actors involved. Alongside the interactive platform, a first report was produced, offering a summary reading of the 2024 data and a general framework useful to guide the consultation of the tool.

### Climate Monitoring of Rome



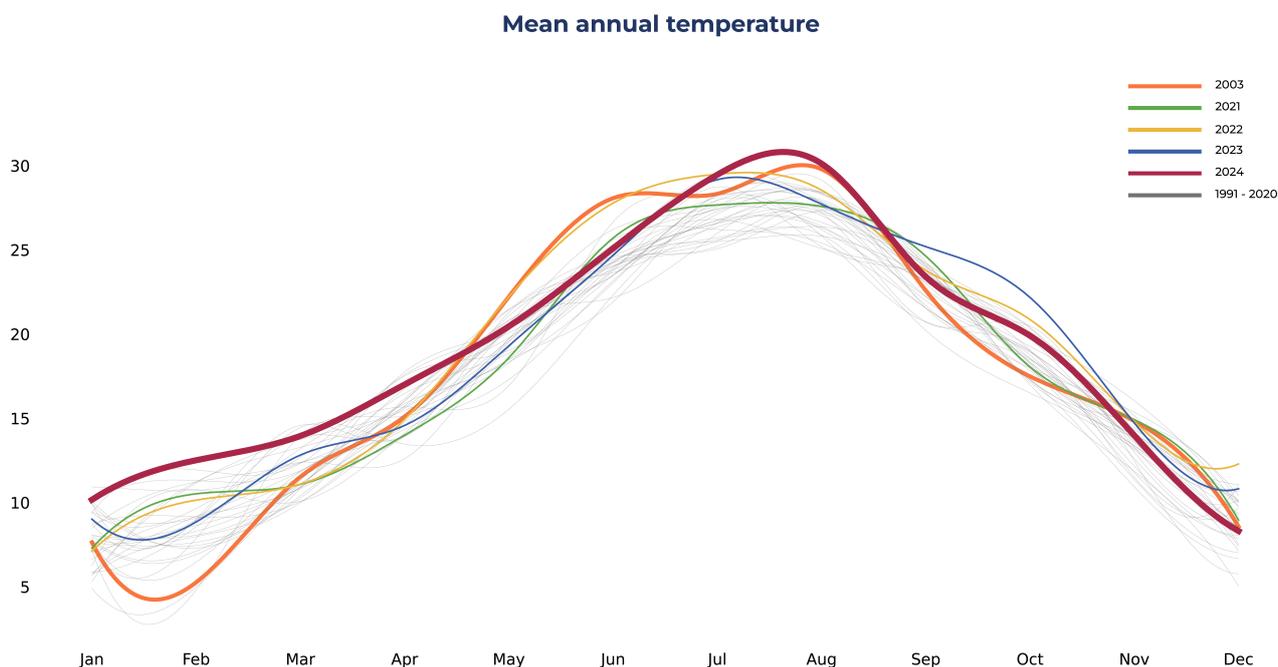


# **The first monitoring report**

# The first monitoring report

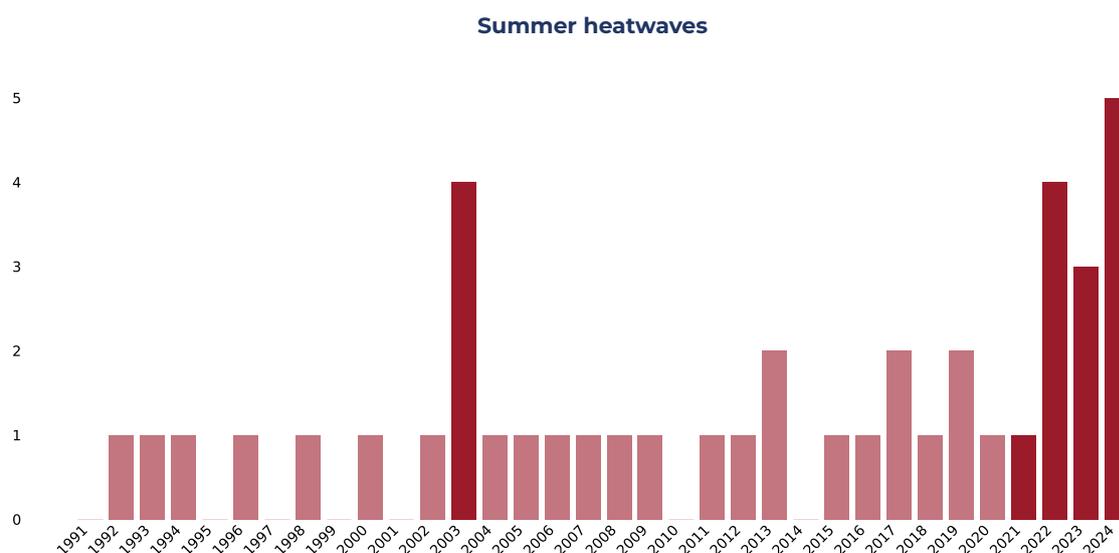
The first monitoring report offers a snapshot of Rome's climate in 2024, through a very high resolution dataset created by the CMCC (VHR-REA\_IT), based on reanalyses, which allow a reconstruction of the climate state in the past and thus a comparison with the present. These results represent average values for 2024 and concern the entire municipality of Rome.

The data show that **2024 was the hottest year since 1991**, with high temperatures and numerous extreme heat events. The average daily temperature calculated for the entire area of the municipality of Rome was 19.7 °C, 2.5 °C higher than the 1991-2020 average.



2024 was **the year with the most torrids nights since 1991**, with 36 nights with daily minimum temperatures above 25°C, almost 30 days more than the 1991-2020 average.

2024 was also **the year with the most summer heatwaves**, recording 5 more than the 1991-2020 period.



**2024 was also a relatively dry year**, with total precipitation less than the average, but still characterised by episodes of extreme rainfall. According to data from weather stations, November was a particularly anomalous month, with almost no precipitation. The indicators estimating the **need for heating on cool days** and for **cooling on hot days**, show a clear trend towards a decrease in the former and an increase in the latter, especially in the summer months.



**2024 was a relatively dry year**

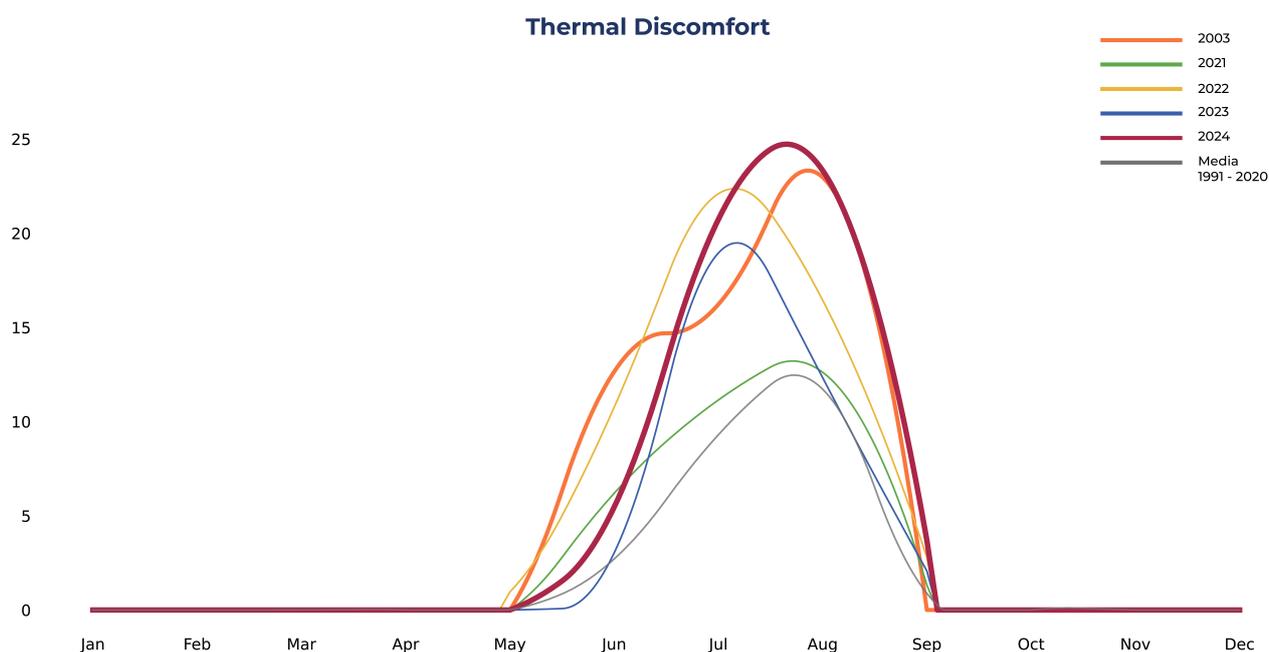
**November 2024** was particularly **anomalous**, with almost no precipitation recorded

**Heating demand** on cold days: **decreasing trend**

**Cooling demand** on hot days: **increasing trend**




**The number of days with severe thermal discomfort** due to the combination of humidity and high temperatures **is increasing**. In particular, the summer months showed a high frequency of days with a perceived temperature above 45°C. For 2024, there were 53 days with extreme thermal discomfort, 29 more than the 1991-2020 average.



It is important to emphasise that **2024 is not an isolated case** but is part of a sequence of recent years such as 2022 and 2023, characterised by marked warming compared to the 1991-2020 average.

All three years are characterised by high values of both the average temperature and several heat-related indicators, such as tropical nights, scorching days and the number of summer heat waves.

The table below shows how some indicators have changed in recent years compared to the average of the years 1991 - 2020. In particular, **the average temperature, hot days** (where the temperature is greater than 30 degrees), **torrid days** (where the temperature is greater than 35 degrees), **tropical nights** (where the minimum temperature is greater than 20 degrees), **torrid nights** (where the minimum temperature is greater than 25 degrees) and the **extreme thermal discomfort index** (days where there is critical thermal discomfort, caused by a combination of high temperature and humidity) were taken into account.

Indicators	Average 1991-2020	2021	2022	2023	2024
 Mean annual temperature (°C)	17,2	17,5 (+0,3)	18,6 (+1,4)	18,3 (+1,1)	19,7 (+2,5)
 Hot days (> 30 °C)	81	93 (+12)	112 (+31)	97 (+16)	90 (+9)
 Torrid days (> 35 °C)	25	29 (+4)	52 (+27)	35 (+10)	52 (+27)
 Tropical nights (> 20 °C)	76	97 (+21)	107 (+31)	95 (+19)	92 (+16)
 Torrid nights (> 25 °C)	7	10 (+3)	23 (+16)	20 (+13)	36 (+29)
 Extreme thermal discomfort (days)	25	31 (+6)	53 (+28)	36 (+11)	53 (+28)



# **Future Scenarios**

## Future Scenarios

For **projections with a 2050 horizon**, higher temperatures and an increase in temperature-related indicators are expected in Rome, in all climate scenarios analysed. The estimates are based on a comparison with average data for the period 1981-2010, the 30-year reference period also used for the elaboration of the city's adaptation strategy.

The scenarios assessed are those defined by the IPCC, the leading international body for the assessment of climate change. The **RCP2.6 "Aggressive Mitigation" scenario**, the **RCP4.5 "Strong Mitigation" scenario** and the **RCP8.5 "High Emission" scenario**.

Under the three scenarios, the **daily mean temperature** could increase by 1.1 °C (RCP2.6 scenario), 1.5 °C (RCP4.5 scenario) and 1.9 °C (RCP8.5 scenario), respectively.

**Tropical nights** could increase by 14 days (RCP2.6 scenario), 22 days (RCP4.5 scenario) and 28 days (RCP8.5 scenario).

The **number of summer heat waves** could increase by 125% (RCP2.6 scenario), 186% (RCP4.5 scenario) and 243% (RCP8.5 scenario).

The **number of days with extreme heat discomfort** from humidity and temperature (perceived temperature > 45°C) could increase by 7 days (RCP2.6 scenario), 12 days (RCP4.5 scenario) and 14 days (RCP8.5 scenario).

**2050**

**CLIMATE SCENARIOS**

**RCP 2.6**  
Aggressive  
mitigation

**RCP 4.5**  
Strong  
mitigation

**RCP 8.5**  
High  
emissions



**Mean  
temperature**  
(°C)

**+1,1**

**+1,5**

**+1,9**



**Number of  
heatwaves** (%)

**+125**

**+186**

**+243**



**Tropical  
nights**  
(days)

**+14**

**+22**

**+28**



**Extreme  
thermal  
discomfort**  
(days)

**+7**

**+12**

**+14**

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