Climate risk communication in Barcelona

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I4C – Climate Adaptlab 2 – Barcelona

meteo.cat Servei Meteorològic de Catalunya

Generalitat de Catalunya

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The SMC in brief

1. The SMC in brief

Who we are?

The SMC is the official meteorological agency responsible for providing weather forecasts, monitoring, and climate-related services for **Catalonia**.

Established in **1921** operated continuously until 1939, when was closed by the Franco's dictatorship.

In **1996**, it was partially recovered as a section in the Environmental Quality service of the Department of the Environment (Catalan Government).

In **2001**, the SMC was finally reestablished by Law as a public entity, and today operates under the Catalan government's Department of Territory, Housing and Ecological Transition.

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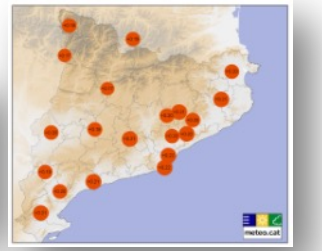
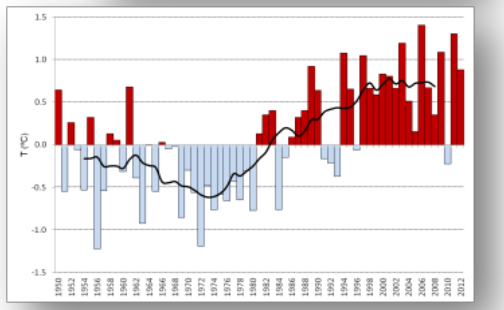
1. The SMC in brief: today

What we do?





- **Weather Forecasts**: Provides daily weather reports and warnings for the public, agriculture, tourism, industries...
- **Natural Hazards**: issues alerts and advisories for extreme weather conditions, such as storms, floods, and heatwaves (in collaboration with Civil Protection).
- **Climate Monitoring**: Collects and analyzes data on Catalonia's climate, managing meteorological stations across the region.
- Design, maintenance and exploitation of the **observation infrastructure**: weather radars, radiosonde station, automatic and manned weather stations, lighting sensors, satellite receiver.
- **Research and Education**: Engages in meteorological and climatological research and promotes educational initiatives in atmospheric sciences.

1. The SMC in brief: what are we good at (strenghts)?

Capacity for direct impact on society

Large amount of data and dense observation network

4 Weather radars (1rst, 1998)

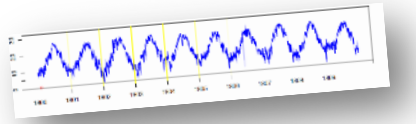
4 Lighting Sensors since 2003

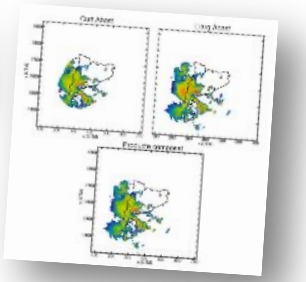
81 Phenological Observers

218 Manned observers and watchers

190 AWS with more than 30 years of data

Quality of data





A specific team is dedicated to QC

Proximity to citizens

421,800 followers

101,000 followers

Public coverage: Government of Catalonia

Generalitat de Catalunya

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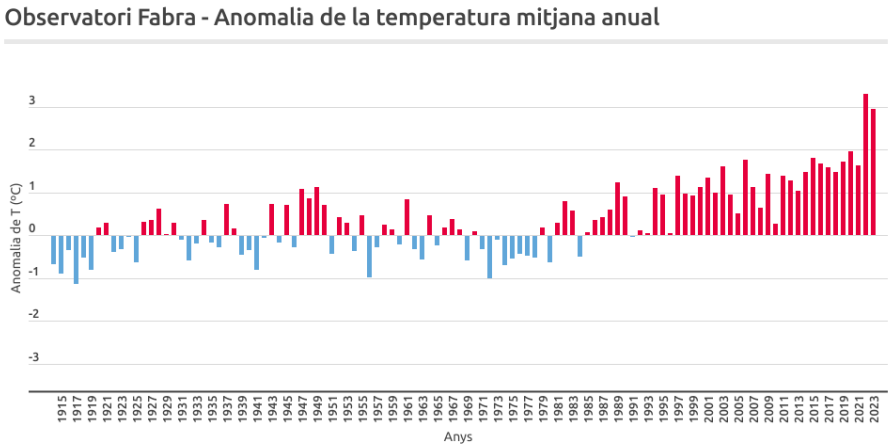
Climate Risks in Barcelona

2. Climate Risks in Barcelona

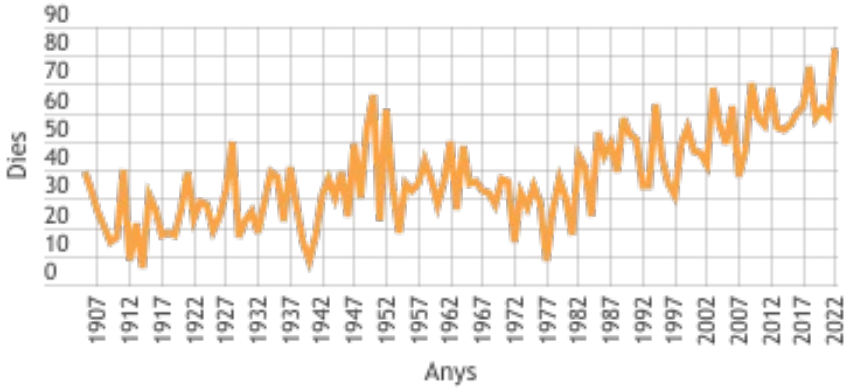
Barcelona, as a Mediterranean coastal city, faces several climate-related risks, including:

Extreme heat

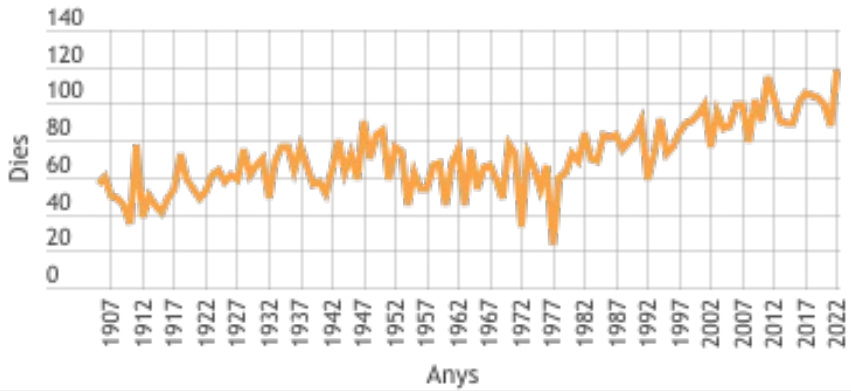
Increasingly frequent and intense heatwaves pose significant health risks, particularly for vulnerable populations such as the elderly, children, and those with pre-existing health conditions.



Evolution of the annual average temperature at the Fabra Observatory (1914-2023) expressed as an anomaly relative to the period 1961-1990.



Tropical Nights at the Fabra Observatory (Number of days in a year with TN > 20°C)

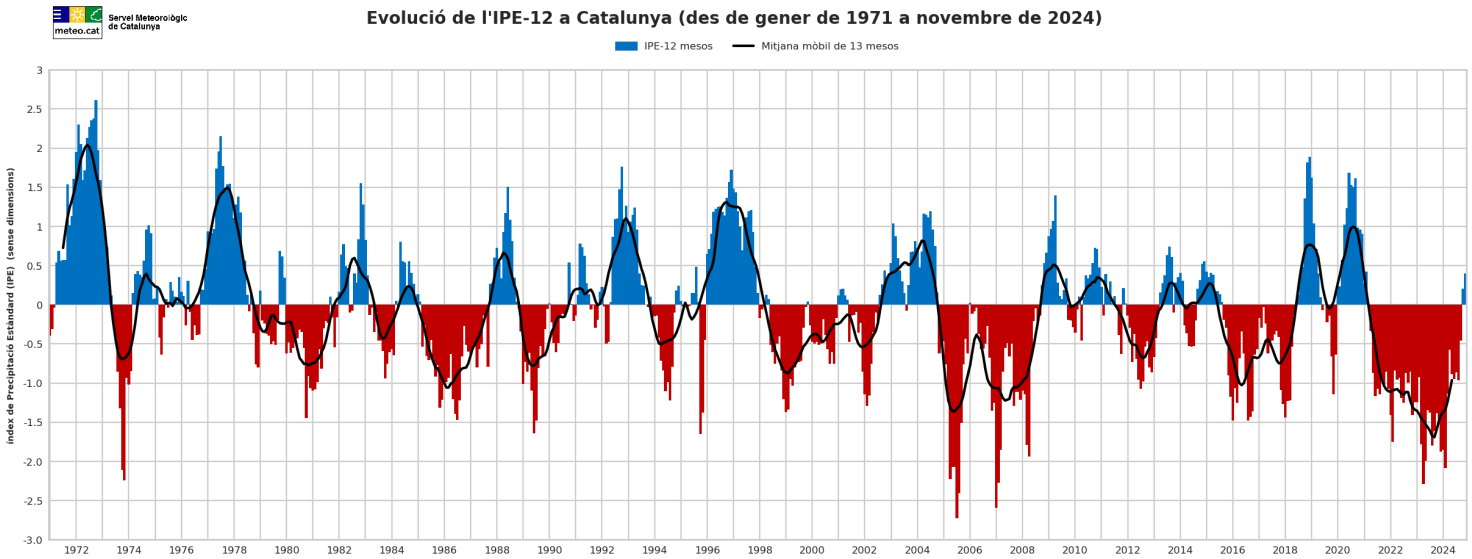


Hot days at the Fabra Observatory (Number of days in a year with TX > 30°C)

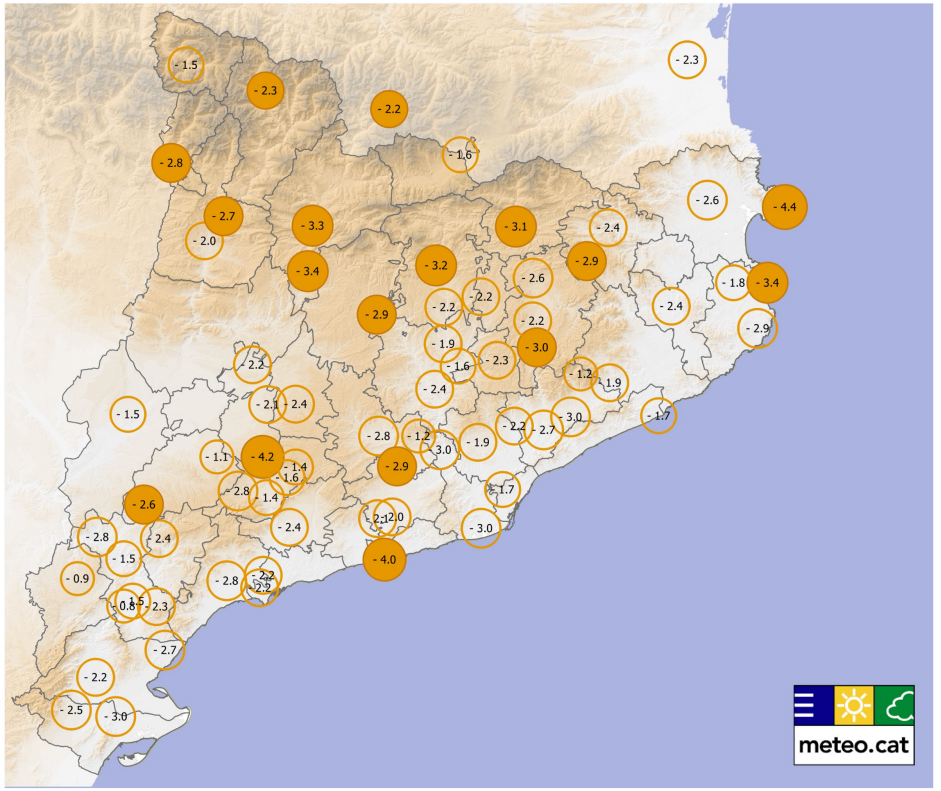
2. Climate Risks in Barcelona

Drought, water scarcity and forest fires

Prolonged dry periods strain water resources, affecting agriculture, industry, domestic consumption and increasing the risk of forest fire.



Monthly Temporal Evolution of the Standardized Precipitation Index at 12 Months (IPE-12) for Catalonia from January 1971 to December 2024



Decadal trend of anual precipitation (1950-2023)

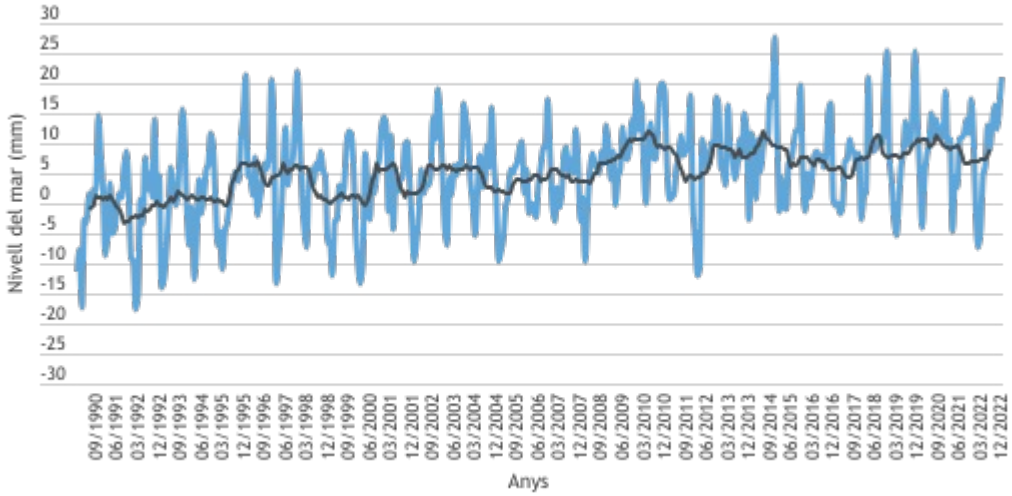
2. Climate Risks in Barcelona

Heavy precipitation episodes

As a Mediterranean city, these episodes occur frequently, especially in autumn.

Sea-level rise

Coastal areas, including the Barceloneta neighborhood, are increasingly vulnerable to storm surges and erosion due to rising sea levels



Evolution of the average sea level at L'Estartit (Costa Brava) (1990-2023).

Effects of storm Gloria (January, 2020)

3

Communicating Climate Risks in Barcelona: the role of the SMC

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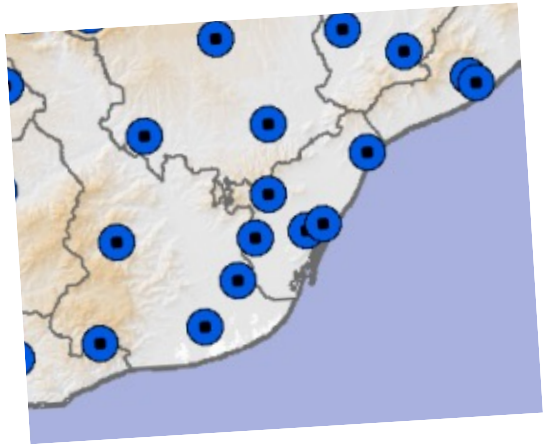
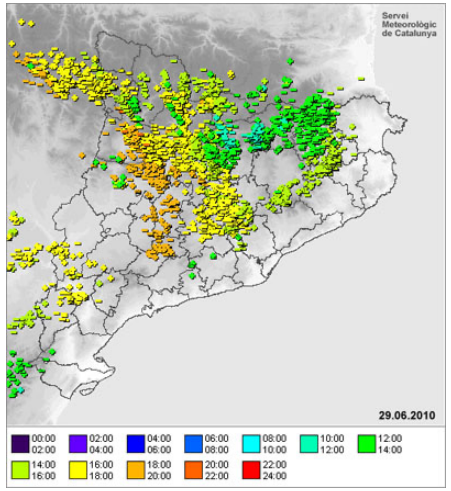
The SMC plays a fundamental role in monitoring these risks and issuing timely alerts to minimize their impact on society.

Weather/Climate Monitoring and Forecasting

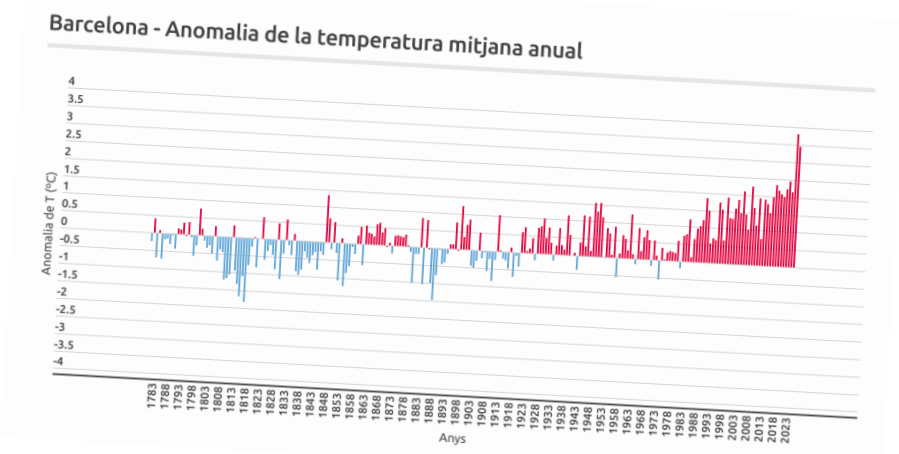
- **Weather Observing System**: AWS, weather radar, Lightning detection network.
- **Short-term forecast**: essential for predicting extreme weather events such as storms and heatwaves.
- **Historical climate data analysis and climate projections**: Helps in understanding trends and informing adaptation policies.



Location of AWS in the Barcelona area



Example of a map from the Lightning detection network



Historical temperature series of Barcelona, back to 1780

3. Communicating Climate Risks in Barcelona: the role of the SMC

Early Warning System

- **Emergency services** (Civil Protection) receive timely information to activate preparedness protocols: Inuncat, ventcat, neucat, POCS.
- **Alerts** are disseminated through multiple channels (social media, oficial websites, and news broadcast).

Operational plan to prevent the effects of heat on health (POCS)

Phase 0

PREPARATORY PHASE (May 1 to 30).

Coordination meetings to activate surveillance, communication, and alert mechanisms. Review of the previous season. Meeting with primary care centers, mental health centers, home care programs, and nursing homes (review of specific plans).

Phase 1

CONDITIONS OF HEAT DANGER (June 1 to September 30).

Daily monitoring of maximum and minimum temperatures, and heat danger warnings issued by the SMC. There are six levels of Heat Stress (SMP) based on the likelihood of intense heat (levels 1, 2, and 3) or very intense heat (levels 4, 5, and 6).

Phase 2

ALERT ACTIVATION.

It is triggered when the established thresholds are expected to be exceeded. Depending on the probability level, the Health Department activates a series of protocols, which may include the redistribution of the most vulnerable individuals or the activation of emergency resources (additional staff).

3. Communicating Climate Risks in Barcelona: the role of the SMC

Collaboration with stakeholders

- **Local governments**: to integrate climate and meteorological data into urban planning and adaptation
- **Academic institutions**: conducting climate Research and improving predictive models.
- **Media**: ensuring accurate dissemination of weather alerts and climate information.

SMC provided accurate climate projections (1km resolution) for the Metropolitan Area of Barcelona

CATALYSE
CLIMATE ACTION TO ADVANCE HEALTHY SOCIETIES IN EUROPE

European project (2022-2027) with ISGlobal. Further develop and communicate evidence of the health impacts of climate change and respond to the urgent need for solutions

Close collaboration with the local TV station Betevé to disseminate all types of climatic and meteorological information of interest.

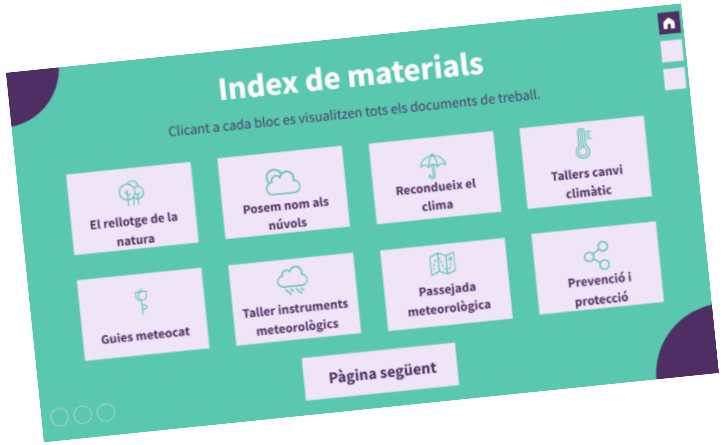
3. Communicating Climate Risks in Barcelona: the role of the SMC

Public awareness campaigns

To ensure that climate risk communication is effective:

- **Online platforms and mobile apps:** Providing accessible and up-to-date climate information.
- **Collaborations with schools:** Integrating climate risk awareness into educational curricula.

SMC APP providing real-time information and data, and weather alerts



Educational resources: conceptualization, design, and development of new content and educational materials Adapting the content to different educational levels and audiences.

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Conclusions

To sum up...

- Climate risk communication is a **vital component** of Barcelona's climate resilience strategy.
- The **SMC plays a central role** in monitoring, forecasting, and disseminating critical weather information to the public and decision-makers.
- Addressing challenges such as misinformation, accessibility, and risk perception remains essential to improving the **effectiveness** of climate risk communication.
- As climate change intensifies, strengthening these **communication strategies** will be crucial in safeguarding Barcelona's population and infrastructure against future climate threats.

MOLTES GRÀCIES!

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