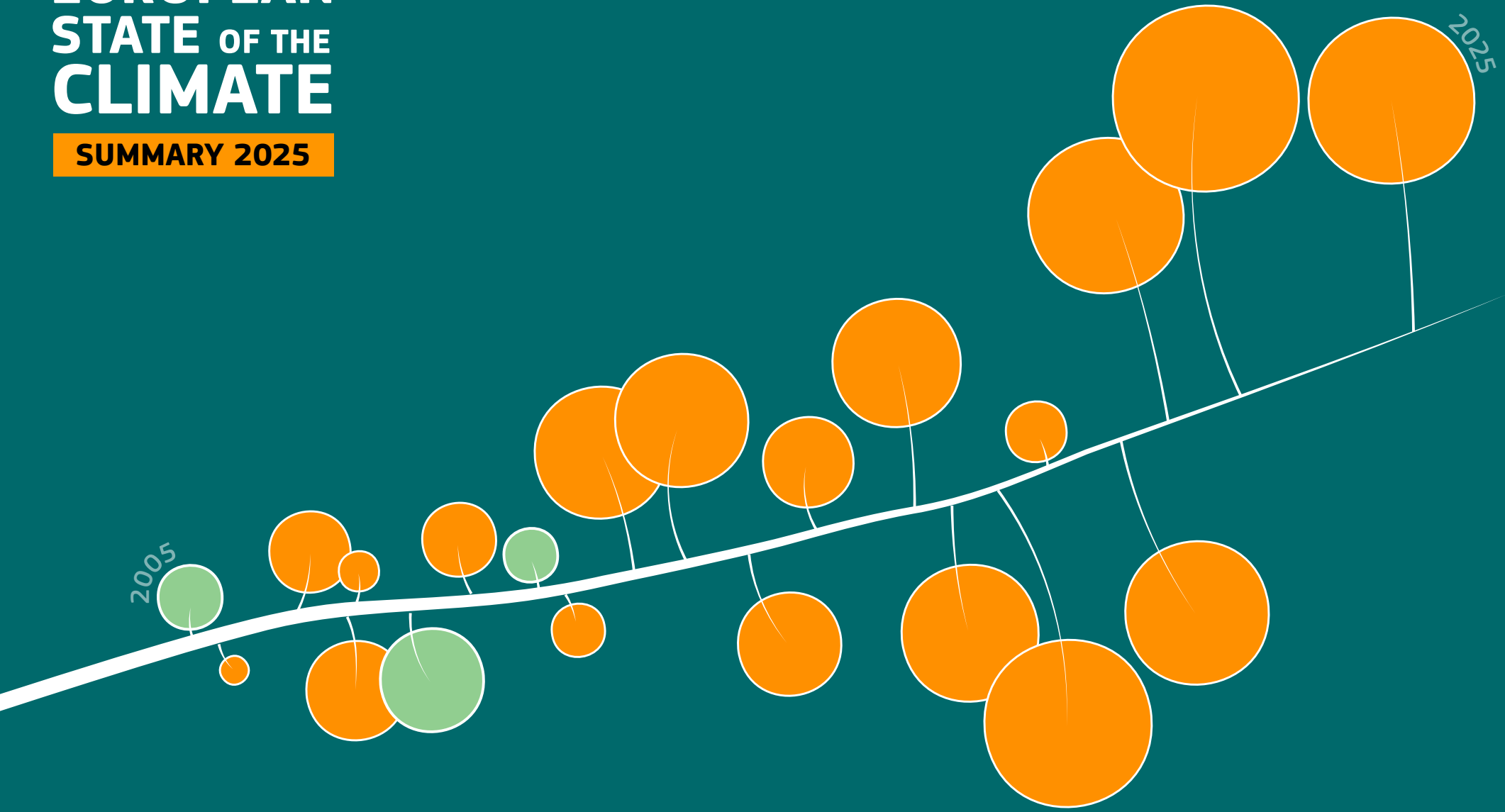
EUROPEAN STATE OF THE CLIMATE

SUMMARY 2025



PROGRAMME OF THE EUROPEAN UNION

Copernicus
Europe's eyes on Earth

Climate Change Service
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WORLD METEOROLOGICAL ORGANIZATION

Introduction

Welcome to the European State of the Climate (ESOTC) 2025. This annual flagship report is jointly published by the Copernicus Climate Change Service (C3S) at ECMWF, and the World Meteorological Organization (WMO).

The ESOTC analyses climate conditions in Europe, covering key variables, events and their impacts, and a discussion of climate policy and action – this year focusing on biodiversity.

Globally, 2025 was the third-warmest year on record*. The current level of global warming is estimated to be around 1.4°C above the pre-industrial level. If warming continues at the present rate, the Paris Agreement's limit of 1.5°C for long-term global warming could be reached by the end of this decade, more than a decade sooner than predicted when the Agreement was signed.

In Europe, the impacts of climate change are clear. Since the 1980s, Europe has been warming twice as fast as the global average, making it the fastest-warming continent. Heatwaves are becoming more frequent and severe, while extreme rainfall is leading to catastrophic floods. Glaciers continue to melt. Climate change is also affecting biodiversity, which is vital for a sustainable future.

This executive summary highlights key messages from ESOTC 2025. **For more details, read the full report online.**

To cite the report: C3S/ECMWF and WMO, 2026: C3S-WMO European State of the Climate 2025, climate.copernicus.eu/ESOTC/2025, doi.org/10.24381/zy93-sb27

The European Centre for Medium-Range Weather Forecasts (ECMWF) implements the Copernicus Climate Change Service on behalf of the European Commission.

*Based on ERA5 and six other datasets.
A further two datasets indicate 2025 was the second-warmest year.

Europe in 2025

Almost the entire continent* saw **above-average annual temperatures** and several northern European countries recorded their warmest or second-warmest year.

Europe saw its **second most severe heatwave** on record, while sub-Arctic Fennoscandia experienced its longest heatwave on record.

Wildfire burnt area and fire emissions both reached **record levels.** The largest contributions came from fires across the Iberian Peninsula in August.

The annual **sea surface temperature** for the European ocean region was the **highest on record** and a record 86% of the region** experienced at least 'strong' marine heatwave conditions.

Glaciers in all European regions saw a **net mass loss.**

End-of-season **snow cover extent** and **mass** were both the third lowest on record.

The year saw strong regional contrasts in hydrological conditions.

Storms and flooding affected some areas, but overall **extreme precipitation and flooding were less widespread** than in recent years.

Renewables supplied nearly half (46.4%) of Europe's electricity in 2025, with solar power reaching a new contribution record of 12.5%.

*95–99.99% depending on the dataset and domain considered.
**Excluding ice-covered areas.

Perspectives on the European State of the Climate

The European State of the Climate report shows, once again, that climate change is a reality for Europe, underlining the importance of an independent, world-class Earth observation system. Copernicus provides the information we need to guide the decisions that will shape a more resilient, more sustainable and stronger future for Europe.

Andrius Kubilius
EU Commissioner for Defence and Space

Europe is warming twice as fast as the global average, with far-reaching repercussions on socioeconomic wellbeing and on ecosystems and biodiversity. The European State of the Climate report, produced jointly by WMO and Copernicus, provides reliable scientific insights to help European policymakers meet the growing challenges to both people and planet.

Celeste Saulo
Secretary-General, WMO

At ECMWF, we are proud to deliver the Copernicus Climate Change Service on behalf of the European Commission and, in partnership with WMO, publish the European State of the Climate. The 2025 report shows a continent warming rapidly and experiencing more frequent extremes. The evidence we provide helps decision-makers take action to protect lives, infrastructure and biodiversity.

Florian Pappenberger
Director-General, ECMWF

The data behind the art

The **cover art** of the European State of the Climate 2025 provides an entry point to a vast and **multifaceted report**. Vivid colours and simple shapes hint at **scientific data** without overwhelming viewers, inviting closer engagement with the report and the science behind it. Using ERA5 data, the visualisation depicts the **annual temperature anomaly for Europe** over the past 20 years. The data were first displayed as a scatterplot, where each dot corresponds to a year and its size is proportional to the magnitude of the anomaly. The chart was then **gradually deconstructed**: dots morph into leaves, while a **trend line** becomes a thinning branch symbolising the **fragile equilibrium** we live in and the biodiversity loss we witness. Yellow and green indicate years with positive and negative temperature anomalies, respectively. While communicating the warming trend across Europe, this symbolic organic form also hints at the **biodiversity** themes explored in the report.

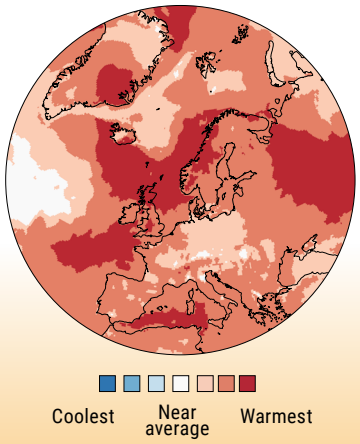
Temperature across Europe's land and seas

Europe is warming more than twice as fast as the global average.

Surface air temperature

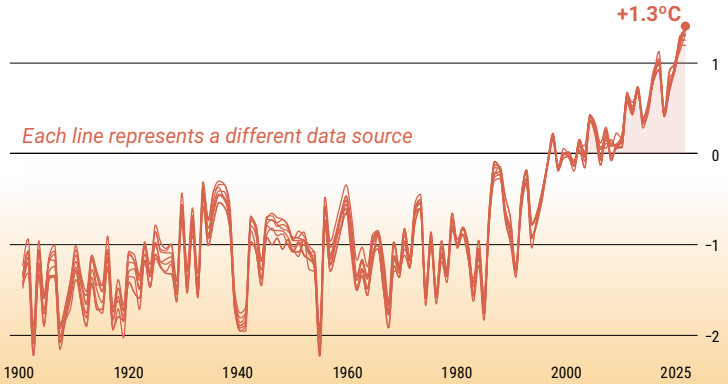
Almost the entire of Europe (**at least 95%**) saw **above-average** annual temperatures in 2025.

2025 saw Europe's **second most severe heatwave** on record.



2025 was the warmest year on record for WMO RA VI (Europe)*

Anomalies in annual surface air temperature

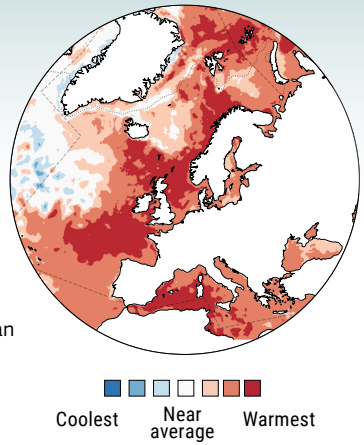


Sea surface temperature

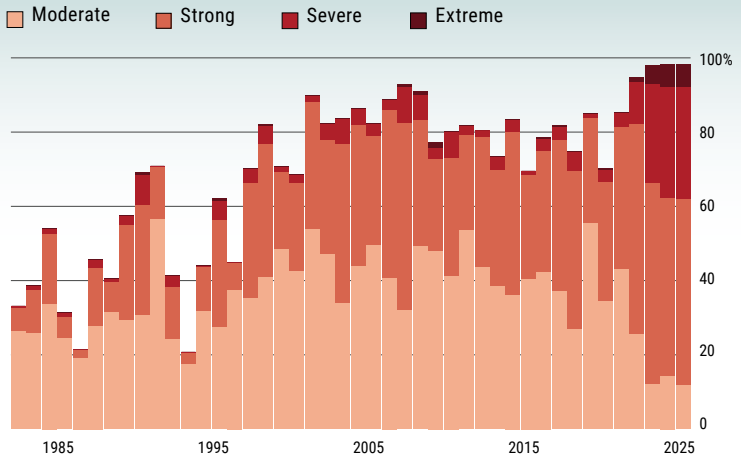
The **annual sea surface temperature** for the European ocean region was the **highest on record.**

86%

A record proportion of the European ocean region experienced **at least 'strong' marine** heatwave conditions.**



Percentage of European ocean experiencing marine heatwaves



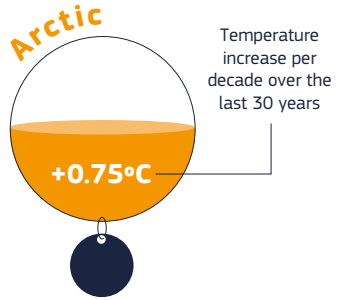
*For WMO RA VI, which covers Europe, Greenland, the South Caucasus and part of the Middle East, 2025 was the **warmest year on record**. For the smaller C3S region, it was **Europe's second or third warmest year**, depending on the dataset.

**Excluding ice-covered areas.

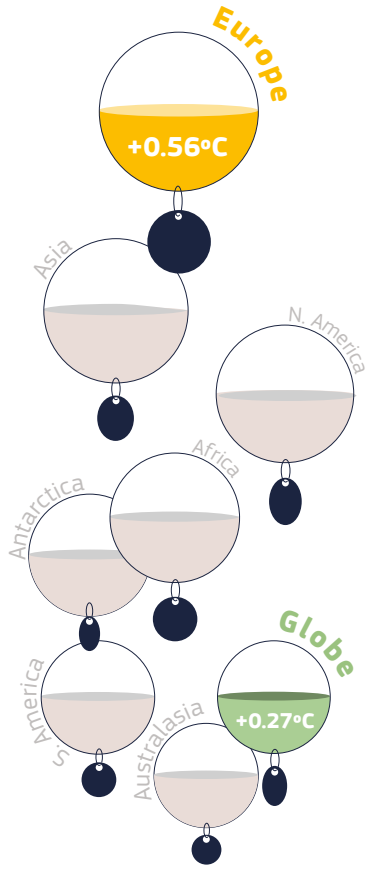
Data: ERA5, HadCRUT5, NOAAGlobalTemp, GISTEMP, Berkeley Earth, JRA-3Q, CMST, CMA-GMST, DCENT-I, C3S Global Sea and Sea Ice Surface Temperature v1.0 • Reference period: 1991–2020 • Credit: WMO/DMI/C3S/ECMWF

For insights into why Europe and the Arctic are warming so rapidly, head to the 'Why is Europe warming so quickly?' section of the full report.

The **fastest-warming region** on Earth is the Arctic



Europe is the **fastest-warming continent**



Hydrological conditions in 2025

Drier than average across most of Europe, but with strong regional contrasts.

Key messages

For Europe as a whole, it was **one of the three driest years for soil moisture** since 1992. In May, **35% of Europe** experienced **'extreme' agricultural drought**.

For northwestern and central Europe, 2025 ranked among the **10 driest in 47 years for precipitation**, in contrast to the exceptionally wet conditions seen in 2023 and 2024.

Despite the occurrence of several significant flood events, the overall **flooded extent** of Europe's rivers was the **second lowest** on record **since 1992** and much smaller than the widespread flooding of 2023 and 2024.

The share of Europe's land area affected by **extreme precipitation** was **below average** and notably smaller than in some recent years, particularly for the most extreme events.

Annual **wildfire emissions** were the **highest** on record for Spain, where contrasting hydrological conditions contributed to large wildfires, and for Cyprus, the United Kingdom, the Netherlands and Germany.

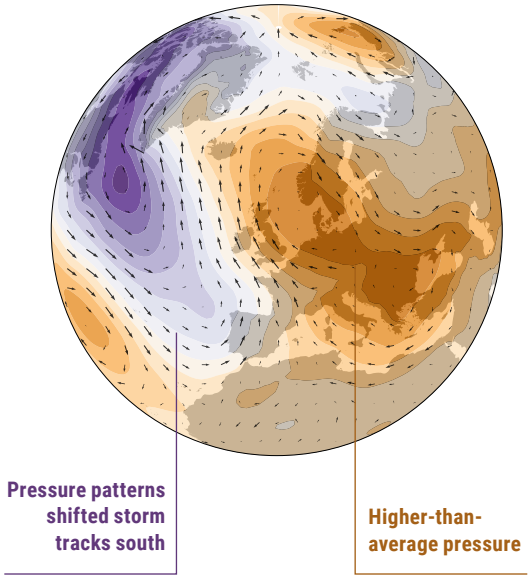
In 2025, much of **northwestern to eastern Europe was drier than average**, with annual precipitation totals 10–40% below average. This contributed to record-low soil moisture in some areas and below-average river flow in 70% of Europe's rivers. In contrast, southwestern and parts of northeastern Europe saw above-average precipitation, soil moisture and river flow. These patterns were also evident in **sunshine and cloud cover** anomalies and shaped climate-driven renewable power potential.

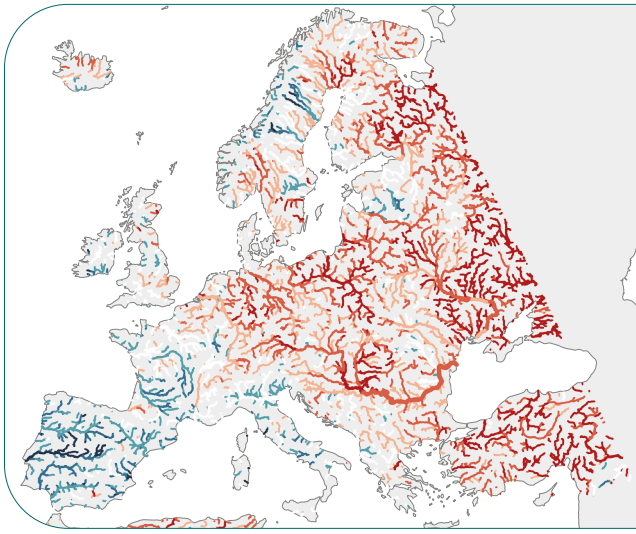
These contrasts aligned with prevailing **atmospheric circulation patterns**. Annual average circulation saw high pressure bringing drier, sunnier conditions to northwestern, central and eastern Europe, and low pressure over the North Atlantic. This shifted storm tracks further south towards southwestern Europe.

Across the Iberian Peninsula, precipitation was most above average in spring, followed by heatwaves during summer. This shift in conditions provided abundant dried vegetation that **fuelled large wildfires**.

According to IPCC AR6*, **precipitation trends** show wetter conditions in northern Europe and drier conditions in southern Europe, alongside increasing frequency and intensity of extreme rainfall events. Europe is one of the regions with the **largest projected increase in flood risk**.

*Intergovernmental Panel on Climate Change Sixth Assessment report.





Anomalies in annual average river flow

Highest | Near average | Lowest

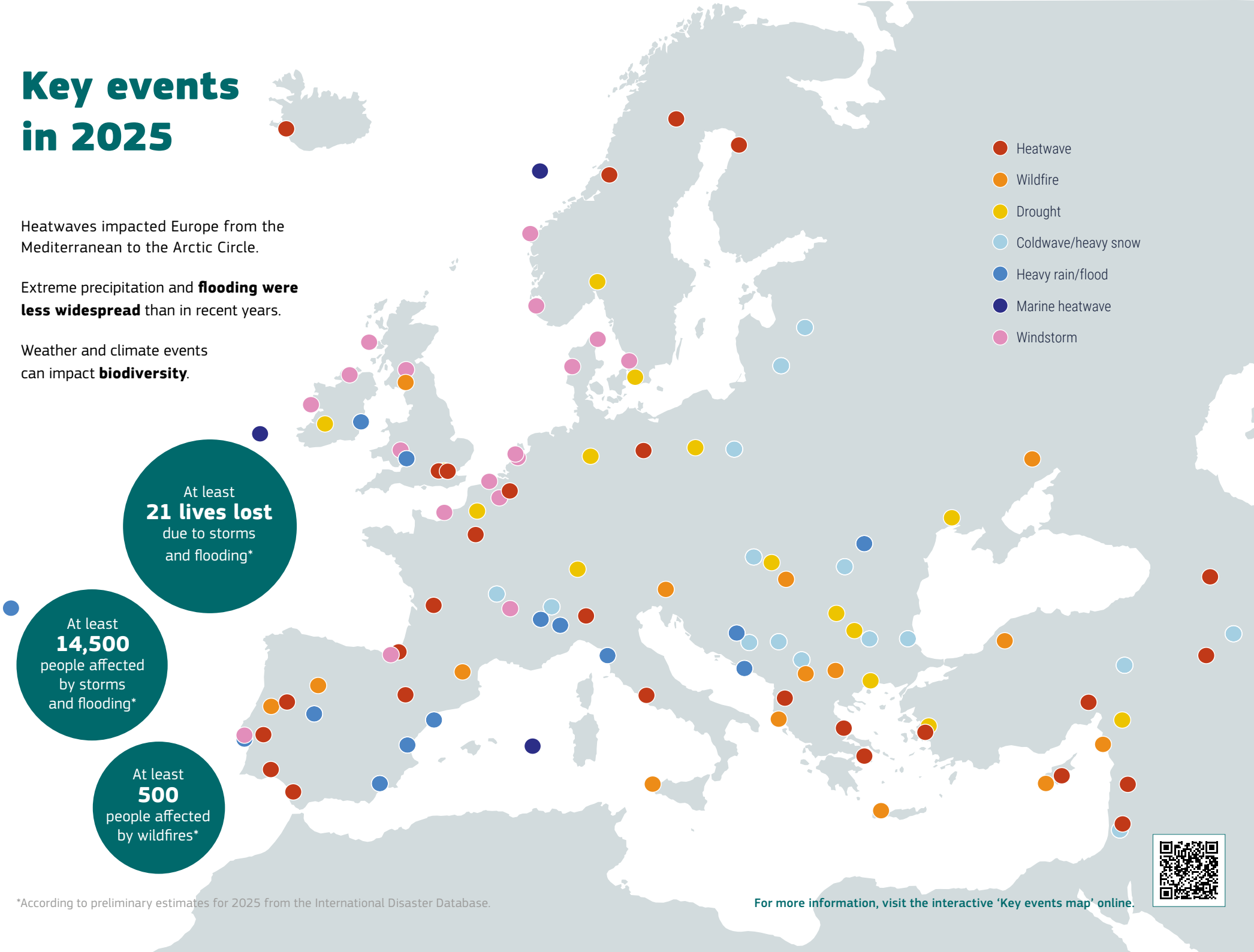
Data: EFAS • Reference period: 1992–2020
Credit: CEMS/C3S/ECMWF

Key events in 2025

Heatwaves impacted Europe from the Mediterranean to the Arctic Circle.

Extreme precipitation and **flooding were less widespread** than in recent years.

Weather and climate events can impact **biodiversity**.



*According to preliminary estimates for 2025 from the International Disaster Database.

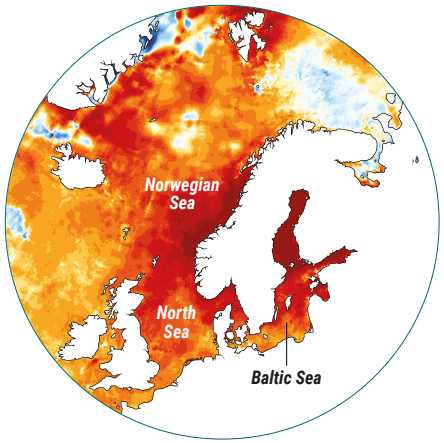
For more information, visit the interactive 'Key events map' online.

Long heatwave in sub-Arctic Fennoscandia

In July 2025, sub-Arctic Fennoscandia experienced its most severe heatwave on record, with temperatures close to and within the Arctic Circle reaching 30°C.

The region typically experiences up to two **'strong' heat stress** days per year, but in 2025, some areas saw almost **two weeks** at this level.

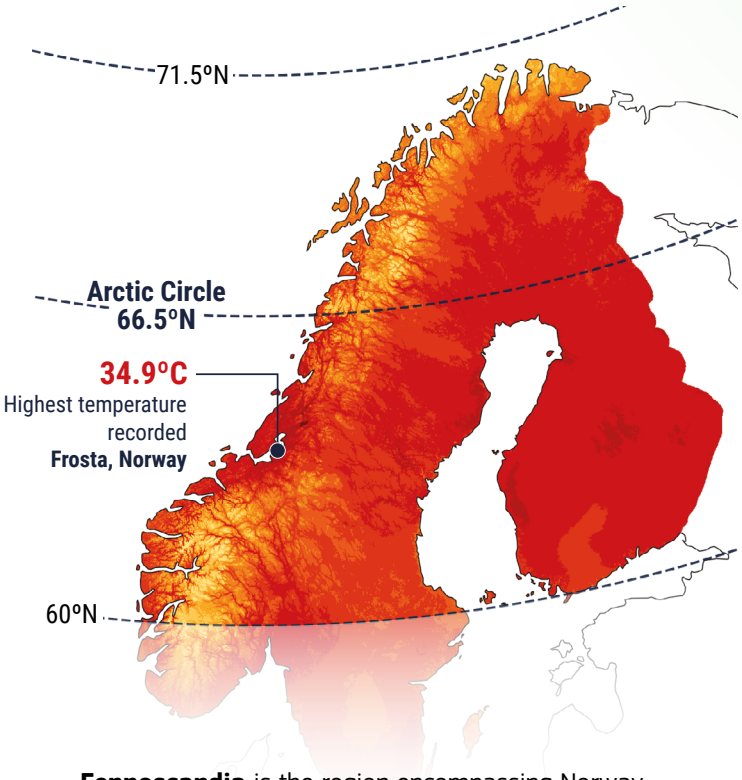
Dry conditions and high temperatures led to **'moderate' to 'severe' drought conditions** during the heatwave, and up to two weeks of high levels of **fire danger.**



Sea surface temperature anomaly (°C) on **24 July**

-5 -3 -2 -1 -0.5 0 +0.5 +1 +2 +3 +5

The heatwave coincided with a **marine heatwave** in the Norwegian Sea, parts of the North Sea and the Baltic Sea.

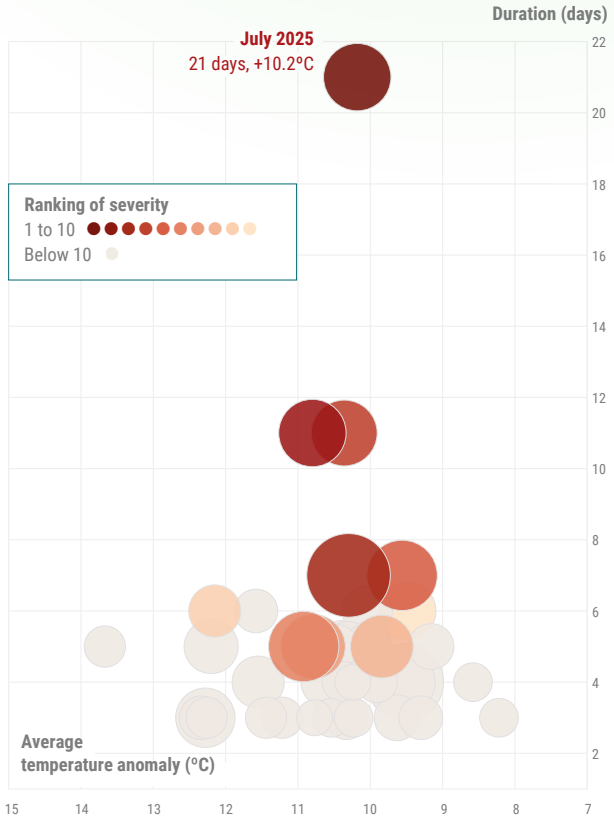


Fennoscandia is the region encompassing Norway, Sweden and Finland. **Sub-Arctic Fennoscandia** refers to the area north of 60°N.

Maximum temperature (°C) in July 2025

18 20 22 24 26 28 30 32 34 36

The heatwave lasted a record **21 days**, from 12 July to 1 August. It was the **longest and most severe** on record.



Data: E-OBS, SYNOP, ERA5, NGCD • Reference period: 1991–2020 (SST), 1961–1990 (heatwaves) • Credit: DWD/C3S/ECMWF/Met Norway

Cold environments in a warming climate

From the Alps to the Arctic, Europe's ice and snow cover are shrinking.

The area of Europe experiencing winter days with freezing temperatures is shrinking.

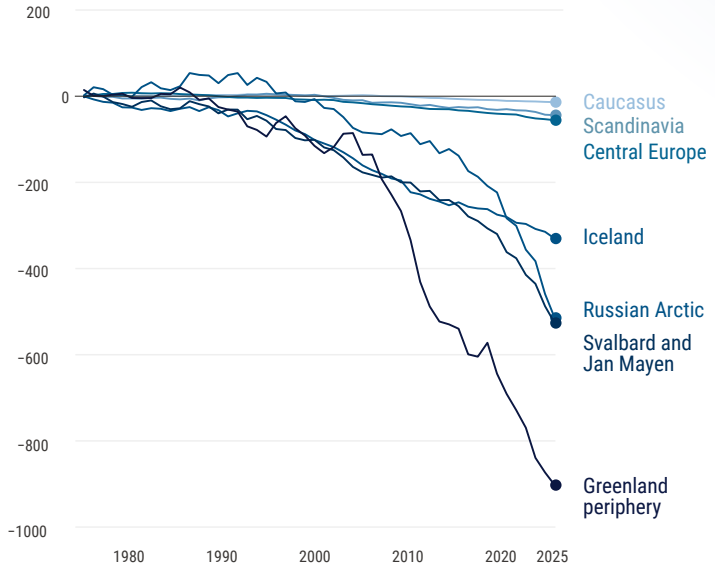
In 2025, end-of-season snow cover extent and mass were the third lowest in the 42-year record.

Glaciers in Europe saw a net mass loss in 2025. The most negative mass balances were observed in Iceland.

In March 2025, the snow covered area was about **1.32 million km² below average** – approximately the area of France, Italy, Germany, Switzerland and Austria combined.

Cumulative glacier mass change for European glacier regions

Annual data by region, in gigatonnes



The Greenland Ice Sheet lost around **139 gigatonnes (1 Gigatonne = 1 billion tonnes) of ice in 2025** – equivalent to around 1.5 times the amount of ice stored in all the glaciers in the European Alps.

Data: ENVEO, WGMS • Reference period: 1991–2020 • Credit: ENVEO/WGMS/C3S/ECMWF

Climate policy and action: Biodiversity

Biodiversity – the variety of life on Earth – is vital for a sustainable future. Climate change is a major cause of its degradation.

Diverse species and habitats support clean air and water, fertile soils and pollination, contributing to food security, livelihoods and health. Biodiversity also helps **regulate the climate and protect against extreme events.**

Climate change and biodiversity are strongly connected within **European policy and frameworks.**

The **European Biodiversity Strategy 2030** aims to protect and restore biodiversity. By the end of 2025, around half of the Strategy's recommended actions were in place or completed, with many of the remainder underway.

Head to the interactive 'Key events map' to find out more.

Examples of biodiversity initiatives across Europe

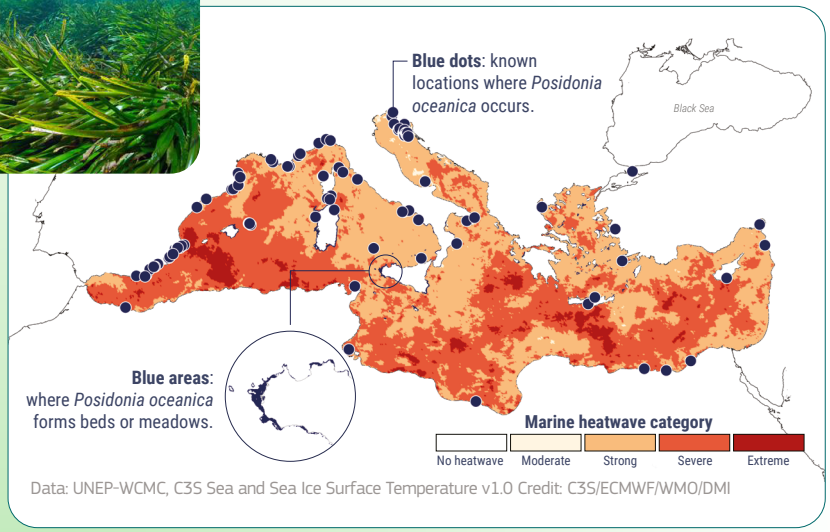
Climate's impact on biodiversity

Marine heatwaves

Climate change is a **major source of pressure** on marine and coastal biodiversity. Marine heatwaves are linked to mass mortality events, shifts in species distributions and seasonal timing, and ecosystem disruption. Marine heatwaves have changed from occasional to annual events. In each of the past three years (2023–2025), the whole Mediterranean Sea experienced at least 'strong' marine heatwave conditions.

Posidonia oceanica is a **Mediterranean seagrass** that covers ~19,000 km^2 along Europe's coasts, providing **ecological and economic benefits**. It is sensitive to high temperatures, which cause thermal stress, increased mortality and reduced growth and productivity. Over the past 50 years, *P. oceanica* meadows have declined by up to 34%. **Protecting and restoring them is vital** for maintaining Mediterranean ecosystem structure and stability.

Conservation of *P. oceanica* meadows over the last decade has **benefited biodiversity and climate resilience**. Protection measures have helped stabilise or restore meadows, supporting increased species richness, more complex seabed communities and nursery habitats for fish. Meadows act as carbon sinks and provide coastal protection by reducing erosion and strengthening resilience to storms and marine heatwaves.



Data: UNEP-WCMC, C3S Sea and Sea Ice Surface Temperature v1.0 Credit: C3S/ECMWF/WMO/DMI

Peatland wildfires

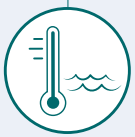
Peatlands are essential ecosystems providing unique habitats and storing large amounts of carbon. They play a key role in addressing **climate change and biodiversity loss**. However, degradation and wildfires can shift them from carbon sinks to major greenhouse gas sources.

Europe has seen the greatest proportional **peatland loss** globally, largely due to high population density and the conversion of land for agriculture. The remaining sites, including Deurnsche Peel and Mariapeel in the Netherlands, are therefore of **high conservation importance**. During dry periods, falling groundwater levels allow peat to dry out and become flammable. Once ignited, **fires can spread rapidly and smoulder underground** for months, as in April 2020 when a 710-hectare fire burned for four days and smouldered for two months.

Peatland fires can cause high mortality among less mobile species such as amphibians and ground-nesting birds, and destroy Sphagnum mosses, altering vegetation and reducing habitat suitability. Wildfire risk in Deurnsche Peel and Mariapeel is being mitigated through **nature-based solutions** including green firebreaks, ecological corridors, buffer zones and reforestation with diverse and native species. Coordinated landscape-scale planning and adaptive forestry are essential for wildfire resilience.

Trends in Climate Indicators

Climate Indicators show the long-term evolution of several key variables that are used to assess global and regional trends in a changing climate.



Sea surface temperature

Increase since the 1980s
Global (60°S–60°N) +0.6°C
WMO RA VI (Europe) +1.1°C
Mediterranean Sea +1.4°C
Latest five-year averages

Ocean heat content*

Increase since 1993
Global +0.16°C
Northeastern Atlantic +0.05°C
In the upper 2000 m

Sea level

Average annual increase since 1999
Global +3.7 mm
European +2–4 mm
February 1999 to August 2025

Temperature

Increase since pre-industrial (1850–1900)
Global +1.4°C
European +2.4°C
WMO RA VI (Europe) +2.6°C
Arctic +3.2°C
Latest five-year averages

Greenhouse gases

Average annual increase since 2020
Carbon dioxide +2.6 ppm
Methane +11.6 ppb
Averaged over the whole atmospheric column for 60°S–60°N

Sea ice

Decrease in ice extent since the 1980s
Arctic (Sep) -2.6 million km² (-33%)
Antarctic (Feb) -0.6 million km² (-20%)
For the month of the annual minimum, for the last five years

Glaciers

Ice loss since 1975
Global -9580 Gt
European -970 Gt
Ice loss for Europe does not include peripheral glaciers in Greenland

Ice sheets

Ice loss since the 1970s
Greenland -5747 Gt
Antarctica -4876 Gt
1972–2025 for Greenland, 1979–2024 for Antarctica

*Traditionally expressed in joules, as it represents the total energy stored in the ocean. To provide a more intuitive understanding of temperature-related changes, this report presents these statistics in °C.

About us

Contributors

The ESOTC's findings are based on expertise from across the C3S and WMO communities, as well as other Copernicus services and external partners. The report is authored by experts at ECMWF, the WMO and data providers from institutions across Europe, edited by the ECMWF team and supported by communications teams at C3S/ECMWF and WMO. It is reviewed by colleagues across the Copernicus network, ECMWF, the WMO, WMO ET–MCCVC and representatives from national meteorological and hydrological services (NMHSs). NMHSs operate observation networks that provide essential data for the monitoring of weather-, climate- and water-related phenomena.

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Copernicus Services implemented by ECMWF

The European Centre for Medium-Range Weather Forecasts (ECMWF) is both a research institute and a 24/7 operational service, producing global numerical weather predictions and other data for our Member and Co-operating States and the broader community. It operates a world-class supercomputer facility for weather forecasting and holds one of the largest meteorological data archives.

ECMWF is a key player in Copernicus, the Earth Observation component of the European Union's Space programme, by implementing quality-assured information on climate change (Copernicus Climate Change Service), atmospheric composition (Copernicus Atmosphere Monitoring Service), and contributing to information on flooding and fire danger (Copernicus Emergency Management Service).

The Copernicus Climate Change Service (C3S)
The C3S mission is to support adaptation and mitigation policies of the European Union by providing consistent and authoritative information about climate change. C3S adds value to environmental measurements by providing free access to quality-assured, traceable data and applications, all day, every day. We offer consistent information on the climate anywhere in the world, and support policymakers, businesses and citizens in preparing for future climate change impacts.

#ESOTC2025 | climate.copernicus.eu | copernicus-press@ecmwf.int

World Meteorological Organization (WMO)

The WMO is the United Nations system's authoritative voice on the state and behaviour of Earth's atmosphere, its interaction with the land and oceans, the weather and climate it produces and the resulting distribution of water resources.

As weather, climate and the water cycle know no national boundaries, international cooperation at a global scale is essential for the development of meteorology and operational hydrology as well as to reap the benefits from their application.

The WMO provides the framework for such international cooperation for its 193 Member States and Territories, and plays a leading role in international efforts to monitor and protect the climate and the environment.

WMO regional office for Europe and RCC network
The Regional Office for Europe is responsible for achieving the WMO's long-term goals and strategic objectives for the 50 WMO Regional Association VI (Europe) Member Countries.

Regional Climate Centres are operational entities of the Global Framework for Climate Services' Climate Services Information System. They serve the members of the WMO through their respective National Meteorological and Hydrological Services, supporting them in meeting their national climate-related duties.

#WMO | wmo.int | media@wmo.int

The data behind ESOTC 2025

The ESOTC 2025 relies extensively on datasets provided operationally and in near real-time by the Copernicus Services. These are freely accessible via data catalogues such as the C3S Climate Data Store (CDS). Explore the full ESOTC online to download report data, and for descriptions of datasets and methods.

Climate Pulse provides near real-time updates of temperature and sea surface temperature. Explore heat and cold stress worldwide from 1940 to near real-time through Thermal Trace. Discover the Copernicus Data Stores Applications, powered by free and open data.

For more details, read the full report online.

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