

The state of the European Climate

Carlo Buontempo – ECMWF

Carlo.buontempo@ecmwf.int

[@carlo_twitter](https://twitter.com/carlo_twitter)



PROGRAMME OF
THE EUROPEAN UNION



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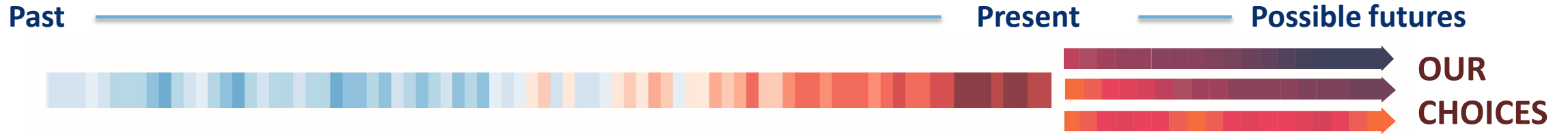


C3S community

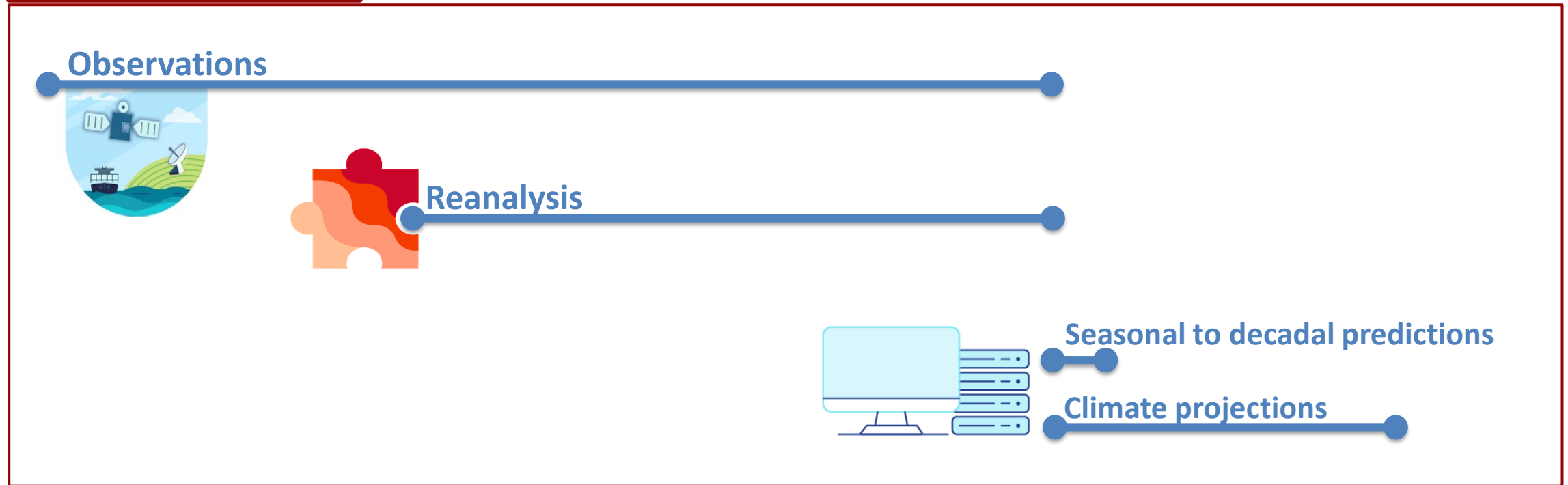




Free data for smart decisions



C3S PRODUCTS





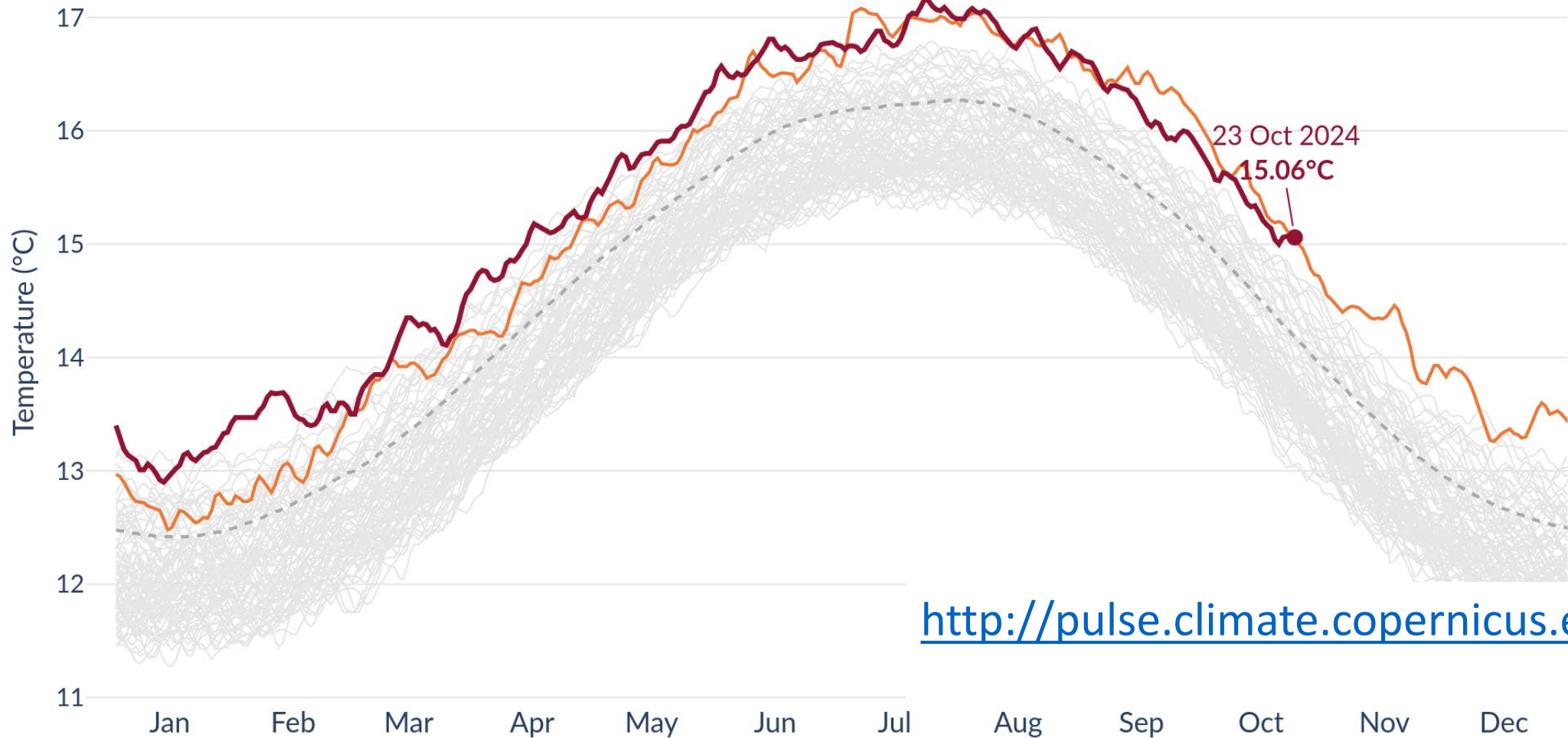
Climate
Change

Daily global surface air temperature

Data: ERA5 1940-2024 • Credit: C3S/ECMWF



— 2024 — 2023 — 1940-2022 - - - 1991-2020 average



<http://pulse.climate.copernicus.eu>



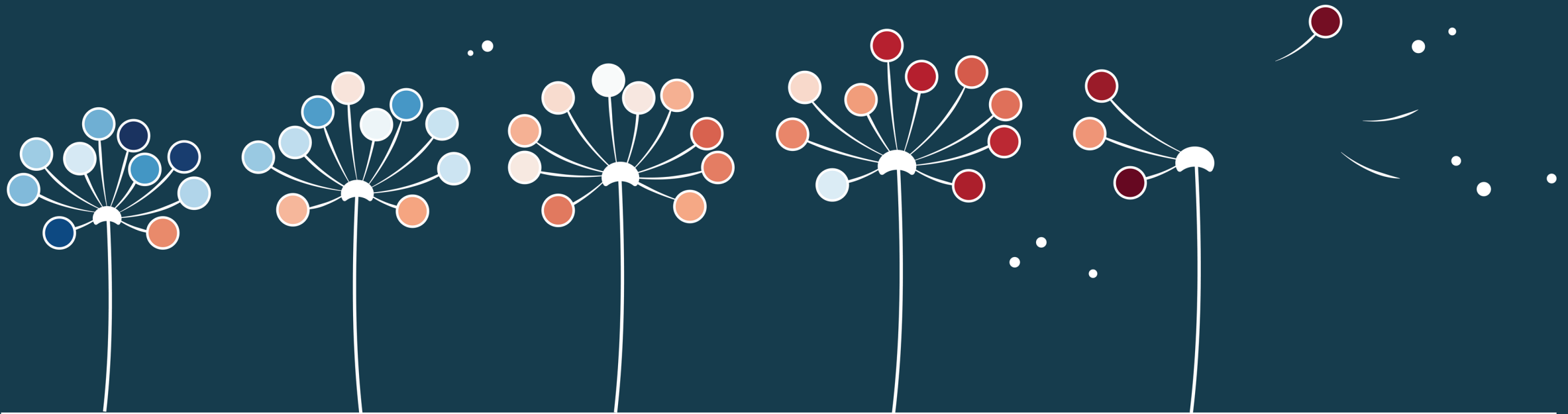
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EUROPEAN STATE OF THE CLIMATE

2023

See the full report online at
climate.copernicus.eu/ESOTC/2023



Copernicus Climate Change Service
European State of the Climate | 2023



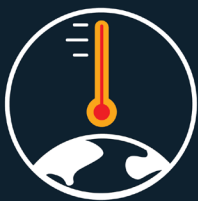
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WORLD
METEOROLOGICAL
ORGANIZATION



Temperature

Global air temperature
+1.3°C Above pre-industrial level

European temperature (over land)
+2.3°C Above pre-industrial level

Arctic temperature (over land)
+3.3°C Above pre-industrial level



Greenhouse gases

Carbon dioxide (CO₂) concentration
419 ppm 2023 average

Carbon dioxide (CO₂) increase
+2.4 ppm per year Since 2010

Methane (CH₄) concentration
1902 ppb 2023 average

Ice and glaciers

Global glaciers
-8200 km³ Ice loss since 1976

European glaciers
-850 km³ Ice loss since 1976

Greenland Ice Sheet
-5470 Gt Ice loss 1972–2022

Arctic sea ice extent
-2.6 Mkm² September loss since the 1980s



Ocean

Global sea level
+10.3 cm Increase since 1993

Global sea surface temperature
+0.6°C Increase since 1980 (60°S–60°N)

Global ocean heat content
+0.22°C Increase since 1993 (upper 2000 m)



Summer heatwaves across Europe

Europe's contrasting summer

Heatwaves

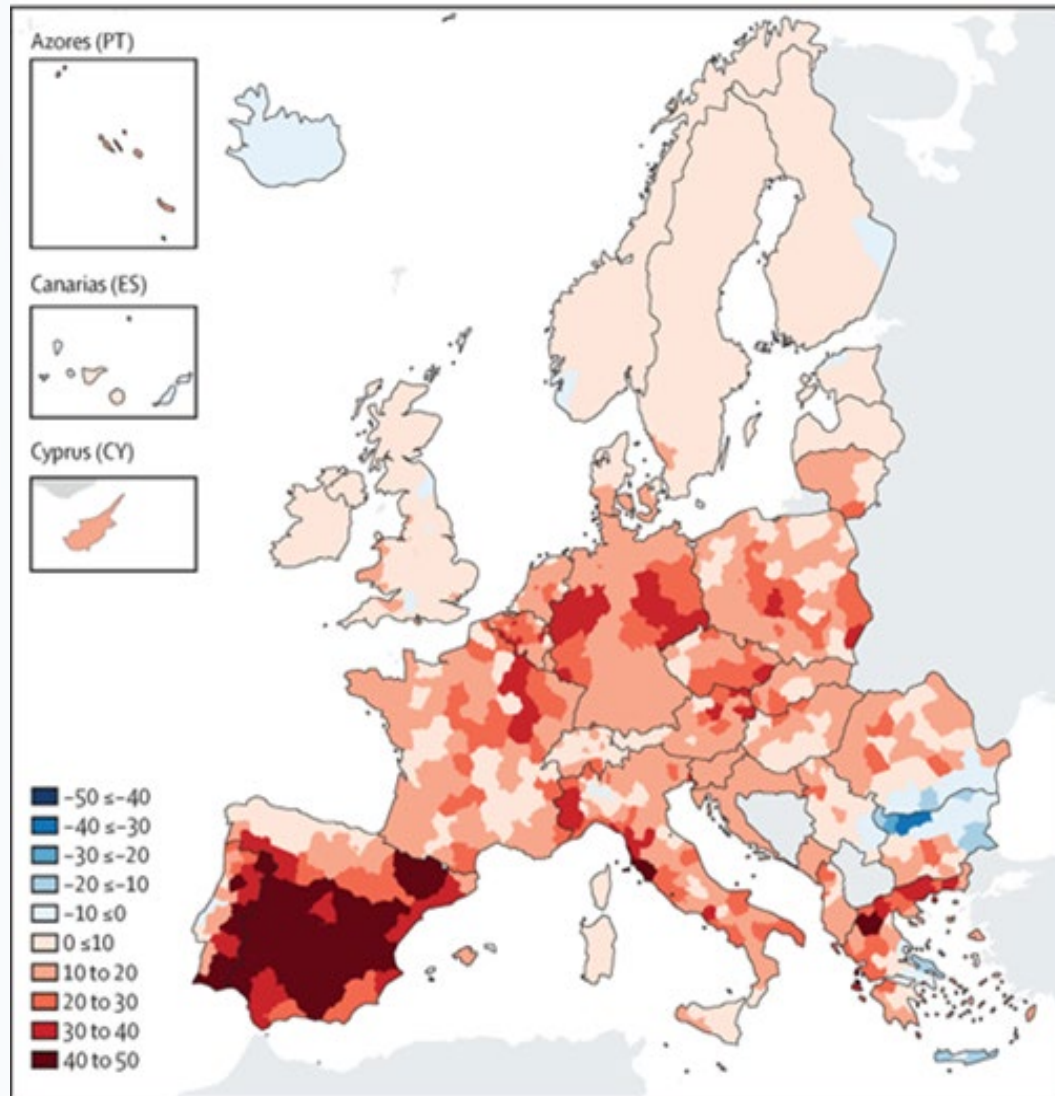


Jun 2023



Data source: European Forest Fire Information System, ERA5
Credit: EFFIS/CEMS/C3S/ECMWF

Trends in heat related mortality in Europe, for the general population
annual death per million per decade (2000–2020)

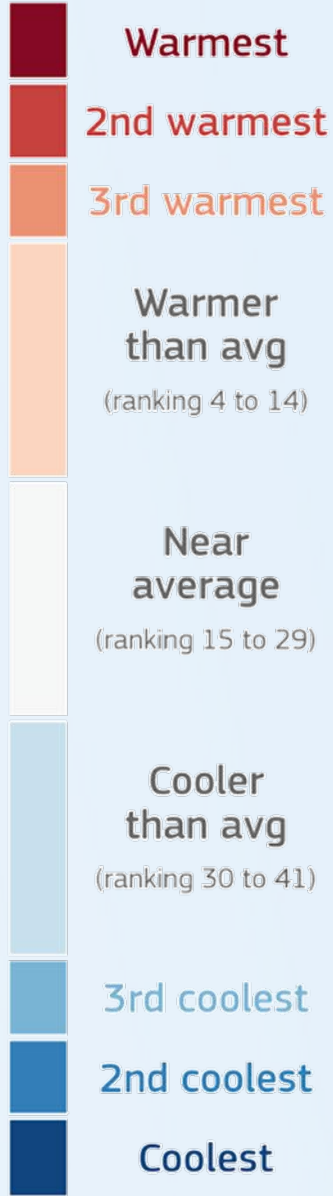
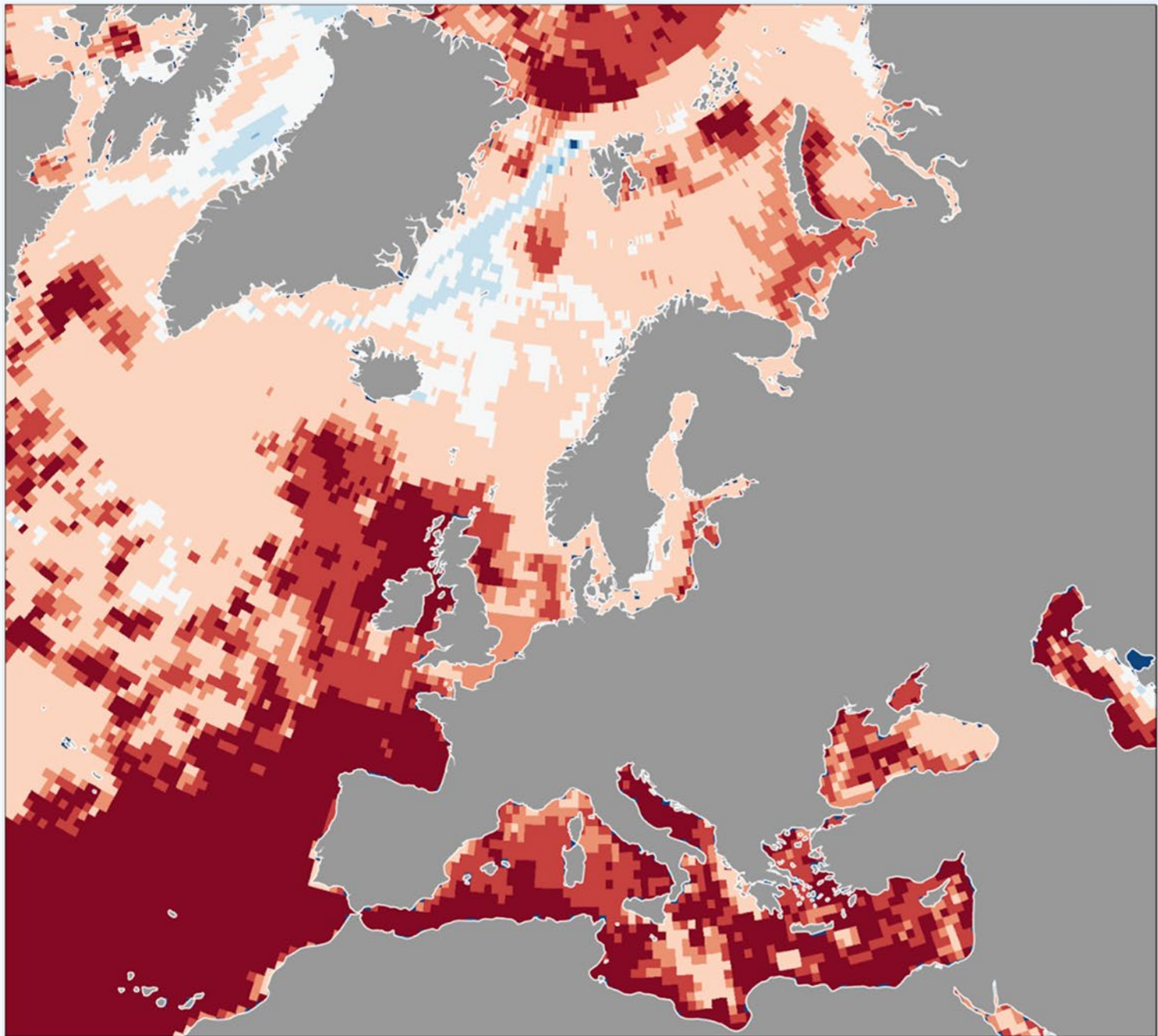


Credit: The 2022 Europe report of the Lancet Countdown on health and climate change

Heat-related mortality has
increased by around 30%
in the past 20 years

Heat-related deaths are
estimated to have
increased in 94%
of European regions monitored

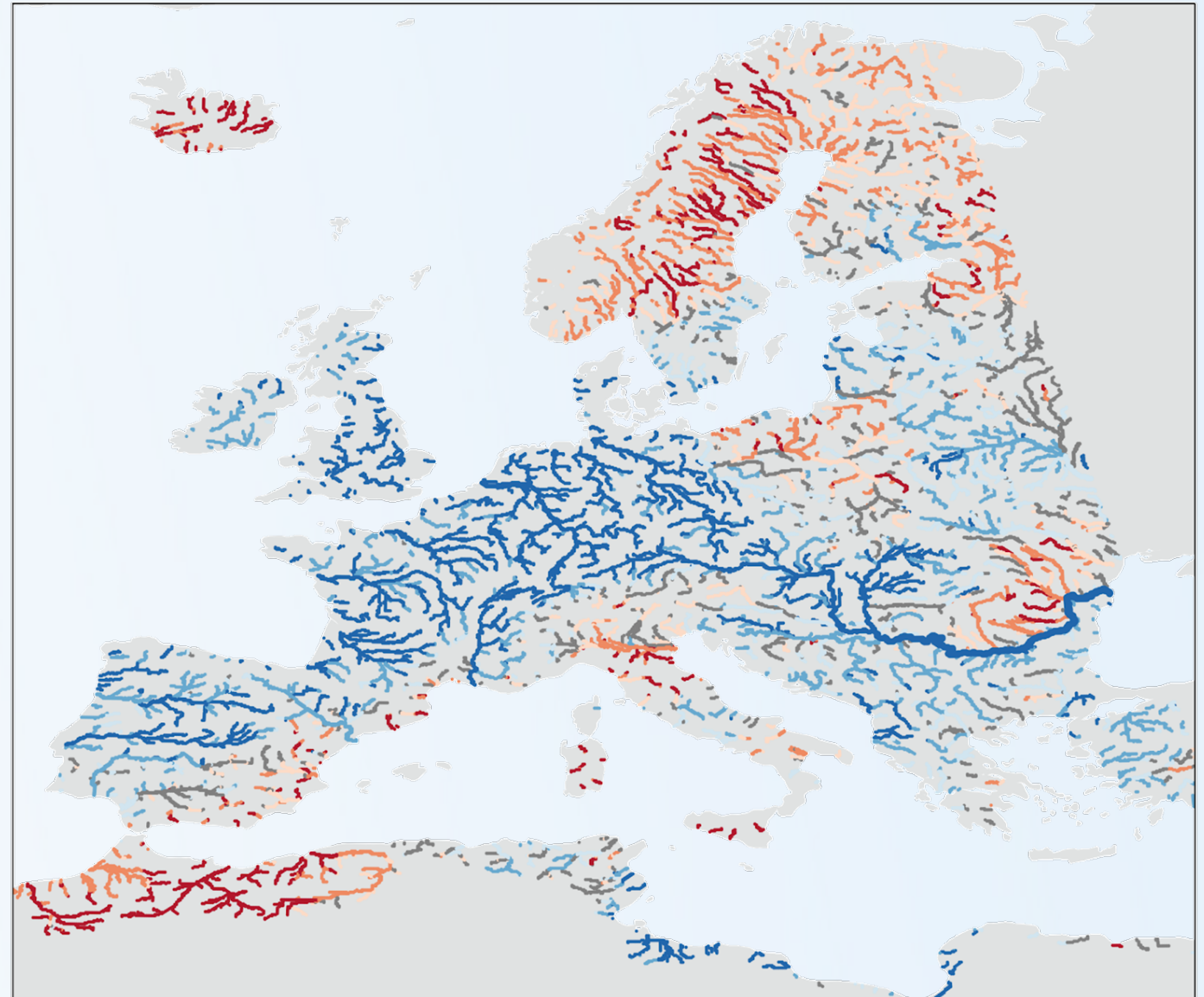
**Warmest
average sea
surface
temperature on
record**



Anomalies in monthly average river flow across Europe in December 2023

Data: EFAS • Credit: CEMS/C3S/ECMWF

Exceptionally low Notably low Below average Average Above average Notably high Exceptionally high



**In December,
river flows were the
highest on record**

Flooding in 2023

Key events in 2023

- Heatwave
- Wildfire
- Drought
- Storm
- Coldwave
- Flood
- Marine heatwave
- Windstorm

Records

Highest number of days with **'extreme heat stress'**

Largest area of Europe affected by at least **'strong heat stress'**

Largest **wildfire**

Highest December **river flows**

Largest proportion of **renewable energy generation**

Warmest **marine heatwave** in the northeastern Atlantic

Impacts*

Losses estimated at **€13.4 billion**

Flooding affected around **1.6 million people**

Storms affected around **550,000 people**, and wildfires **36,000**

At least **63 lives lost** due to storms, **44** to floods and **44** to wildfires

81% of economic losses attributed to flooding

**According to preliminary estimates for 2023 from the International Disaster Database. Estimates of the impacts of heatwaves in 2023 are not yet available.*

EN DIRECTO

Al menos 70 muertos y decenas de desaparecidos en la peor gota fría del siglo en Valencia



REQUENA (VALENCIA)

MIÉRCOLES 30 DE OCTUBRE DE 2024

Una mujer de 88 años muere en Cuenca y otra en Albacete, donde hay cinco desaparecidos. Defensa ofrece morgues portátiles, psicólogos y perros para localizar cadáveres. Hay varias carreteras cortadas, entre ellas la A-3 y la A-7, y la mayoría de los trenes no operan, incluida la alta velocidad Madrid-Valencia, que estará cerrada todo el día. El Gobierno declara la zona como “altamente afectada” por la dana y anuncia tres días de luto

Hace 2h

Aemet eleva el aviso de amarillo a naranja en Barcelona por riesgo de tormenta con granizo

Hace 3h

Las lluvias torrenciales dejan aislada la prisión de Picassent, con cerca de 2.000 reclusos



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User guidance

Copernicus Interactive Climate Atlas

Mean temperature (°C) - CMIP6 - Change - Warming 2°C - Annual - rel. to 1850-1900

Mean temperature ▼ CMIP6 ▼

AR6 Regions ▼

Climatology and Changes Global warming levels

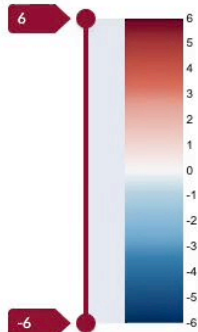


Quantity

Change ▼

Season

Annual ▼

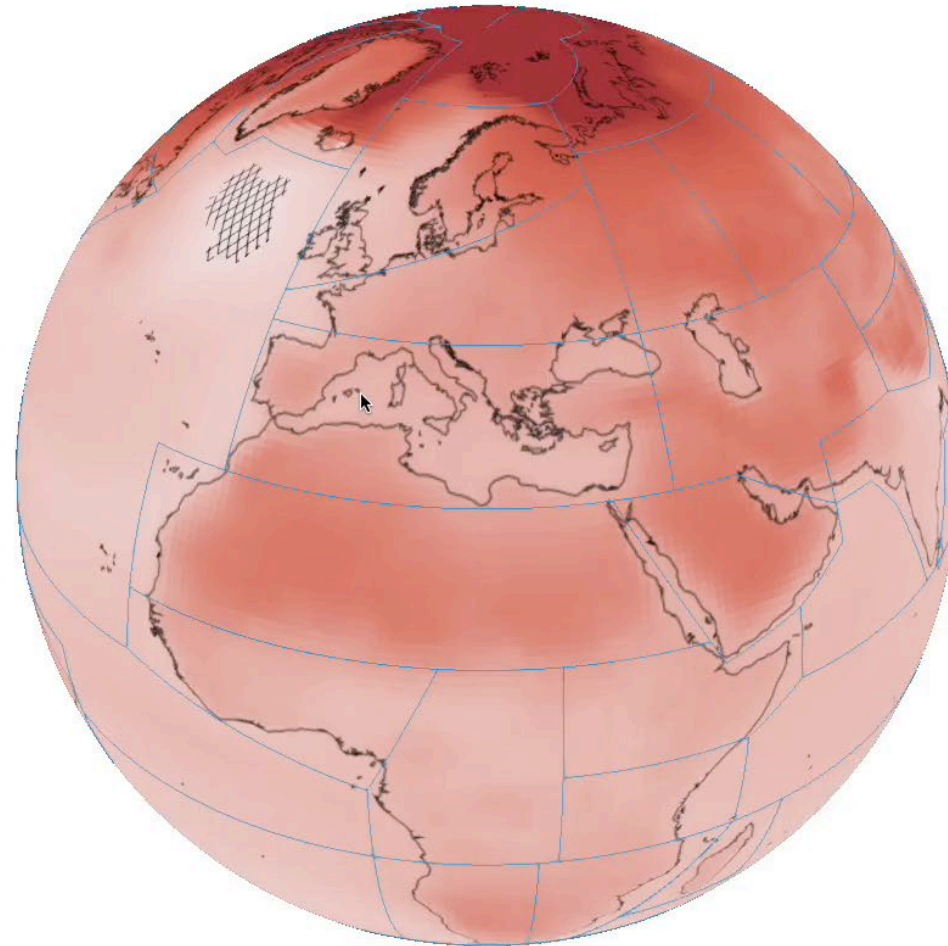


Units: °C

Robustness:

- Robust signal (original color)
- No change or no robust signal
- Conflicting signals

Palette ☰ Autofit ↻ Reset





Climate Change



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Thank you for your attention

