

Climate change: unpacking the urgency

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17th International Conference Crisis Management Days

Terme Tuhelj

May 22 2024

Issues

1. [What do we know about climate change?](#)
2. How urgent is the climate crisis?
3. What should we do?
4. When?
5. Why?
6. Who will pay for it?
7. What is the cost of non-action?

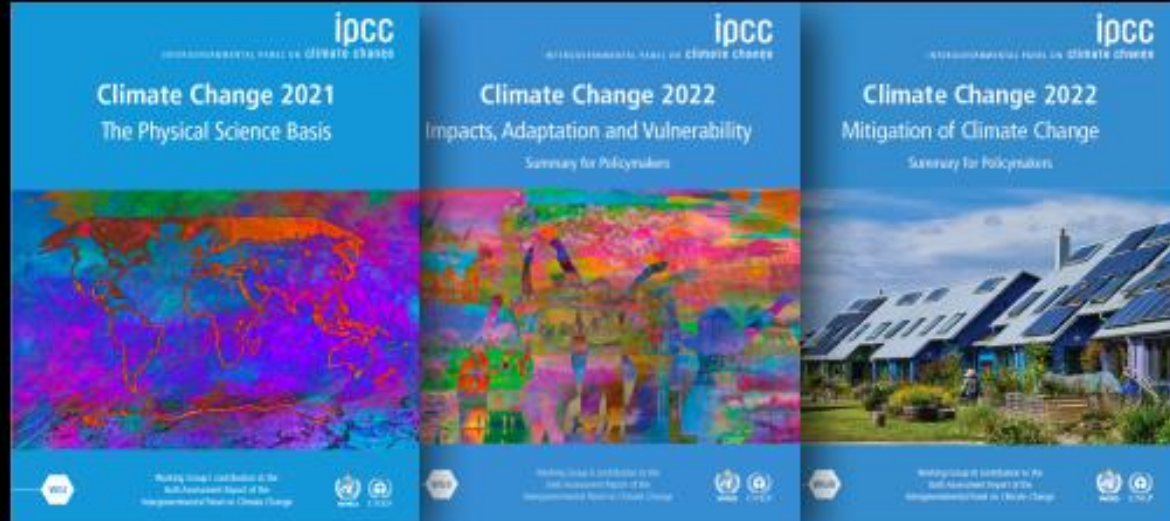
The State of Knowledge about Climate Change

WGI

WGII

WGIII

Special Report



AR6 Climate Change 2021: The Physical Science Basis

Climate Change 2022: Impacts, Adaptation and Vulnerability

Climate Change 2022: Mitigation of Climate Change

Ocean and Cryosphere in a Changing Climate

Climate Change and Land

Global Warming of 1.5 °C

Climate Change Unveiled: 6 Key Takeaways from the IPCC's 6th Assessment Report

59
GtCO₂-eq

State of Anthropogenic GHG emissions worldwide in 2019

3x

Factor of European per capita emissions (7.8 tCO₂-eq) compared with Southern Asia

2,000,000
years

Time frame in which current CO₂ concentration marks the all time high

1,1
°C

Anthropogenic increase in global surface temperature between 1850-1900 and 2010-2019

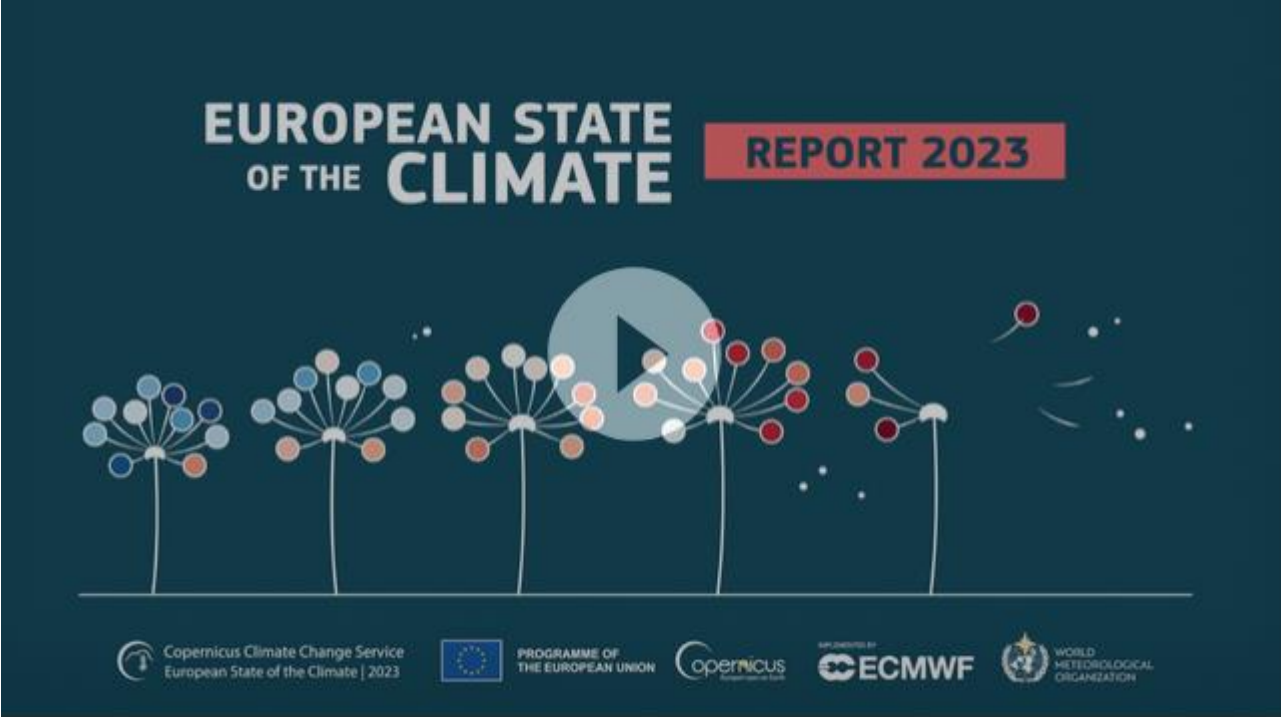
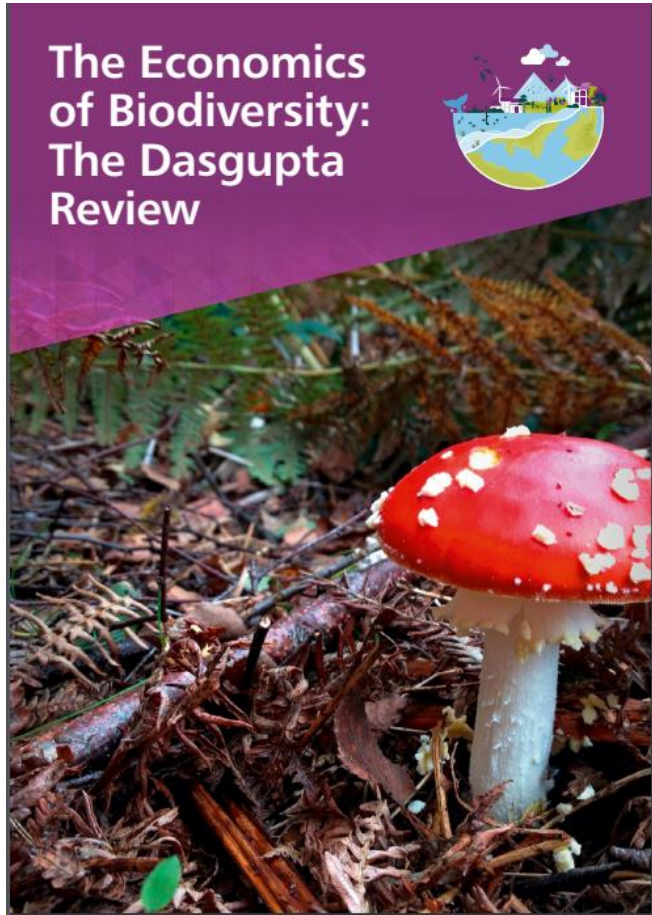
3,3
billion

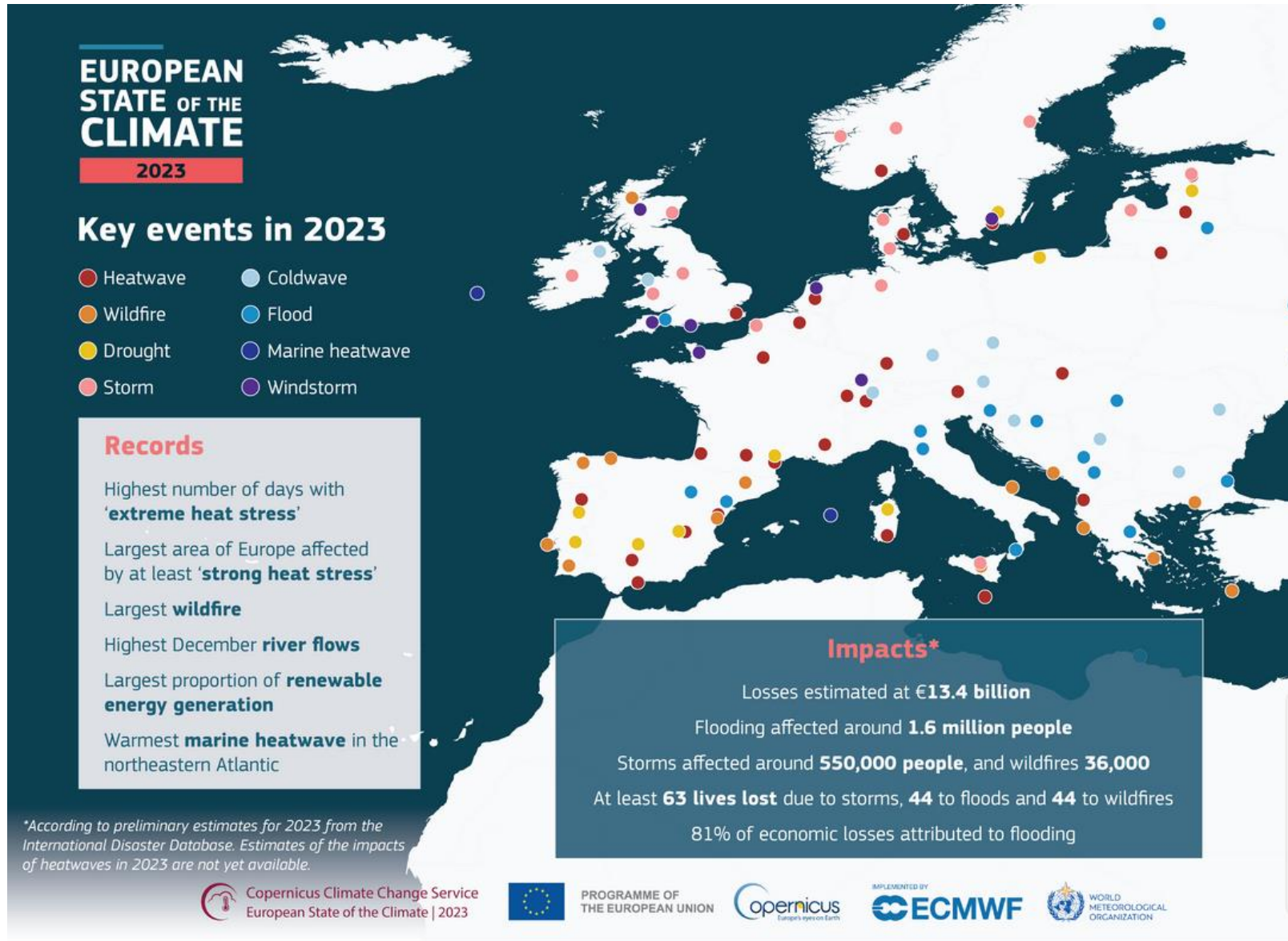
People living in highly vulnerable conditions to climate change (minimum boundary)

3-6

Factor for annual investment requirements between 2020 and 2030 compared with current levels to achieve 1.5°C or 2°C target

Source: [Köhnke \(2023\)](#)

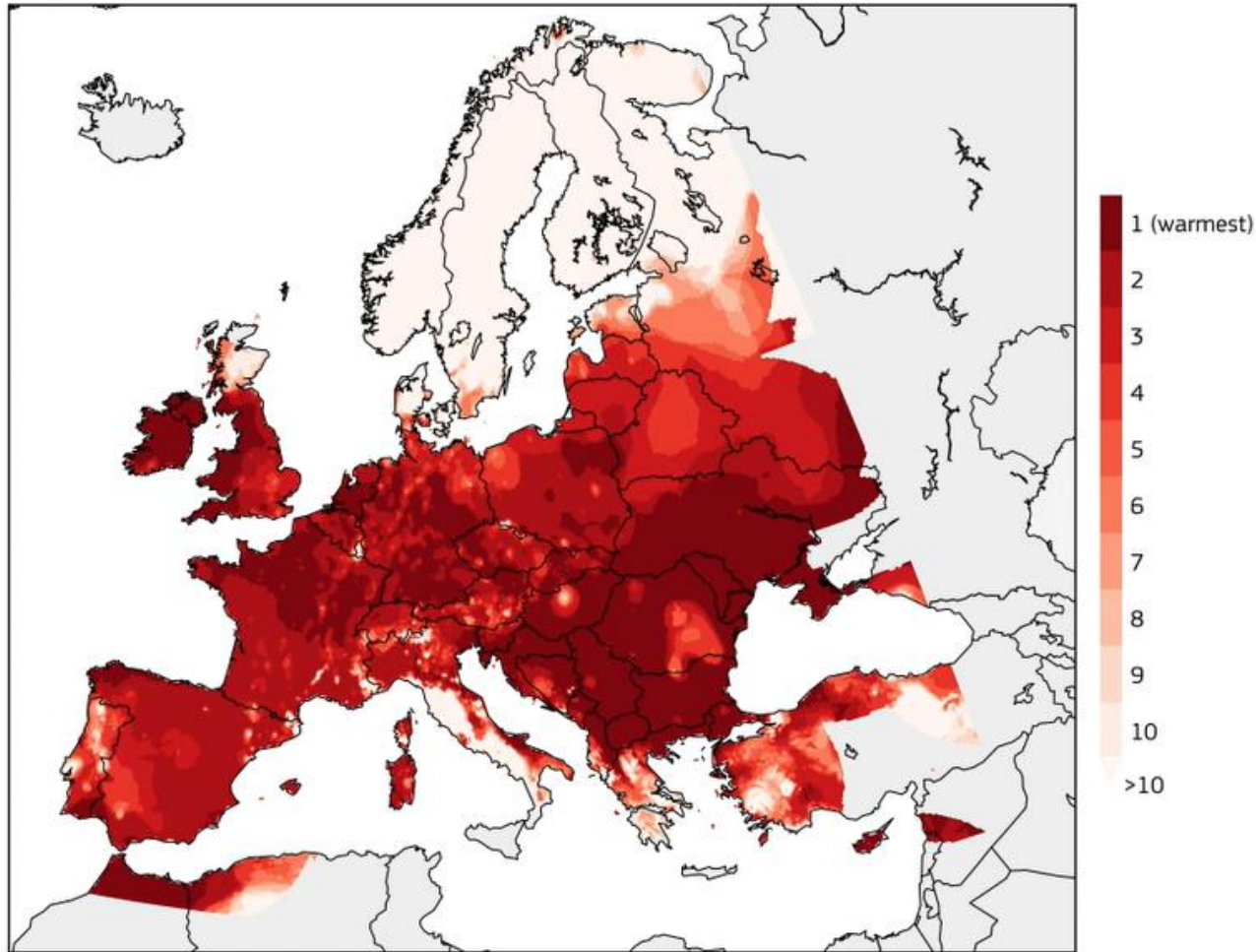




Source: Copernicus Climate Change Service (C3S), 2024: European State of the Climate 2023, Full report: climate.copernicus.eu/ESOTC/2023

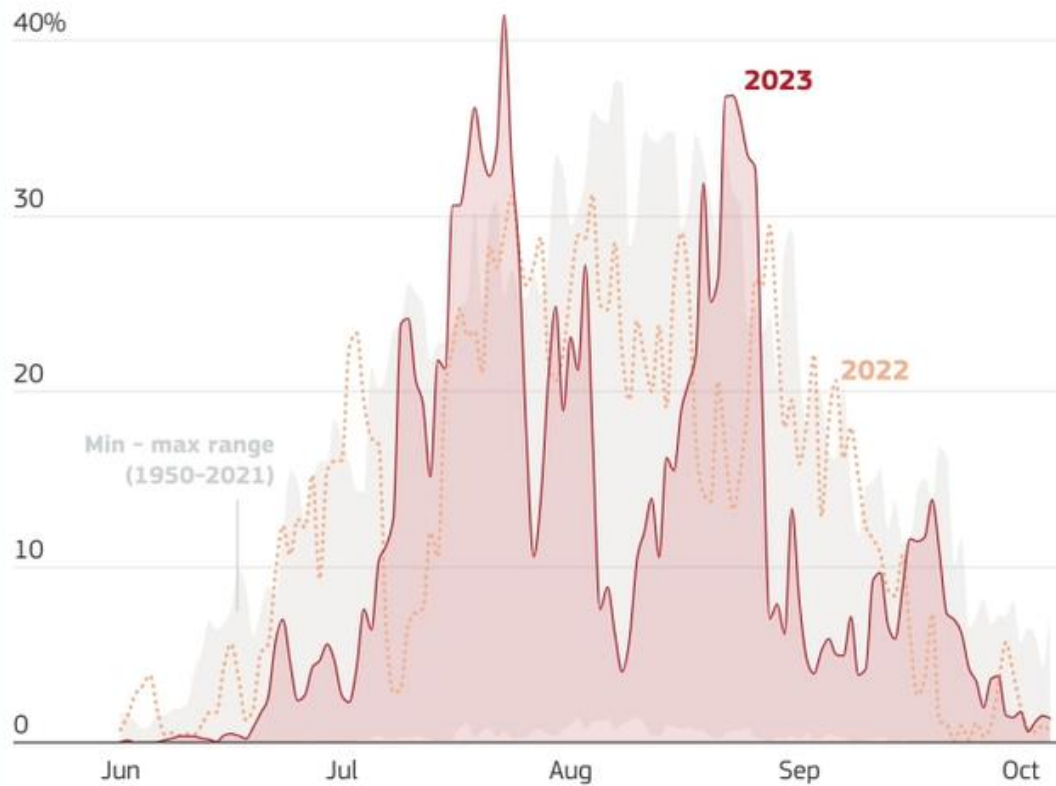
Ranking of annual average surface air temperatures in 2023

Data: E-OBS • Credit: KNMI/C3S/ECMWF



It was the joint warmest or second warmest year on record for Europe, depending on the dataset.

Area of southern Europe affected by 'strong' or 'extreme' heat stress



Data: ERA5-HEAT daily maximum *Universal Thermal Climate Index (UTCI) • Credit: C3S/ECMWF

Copernicus Climate Change Service
European State of the Climate | 2023



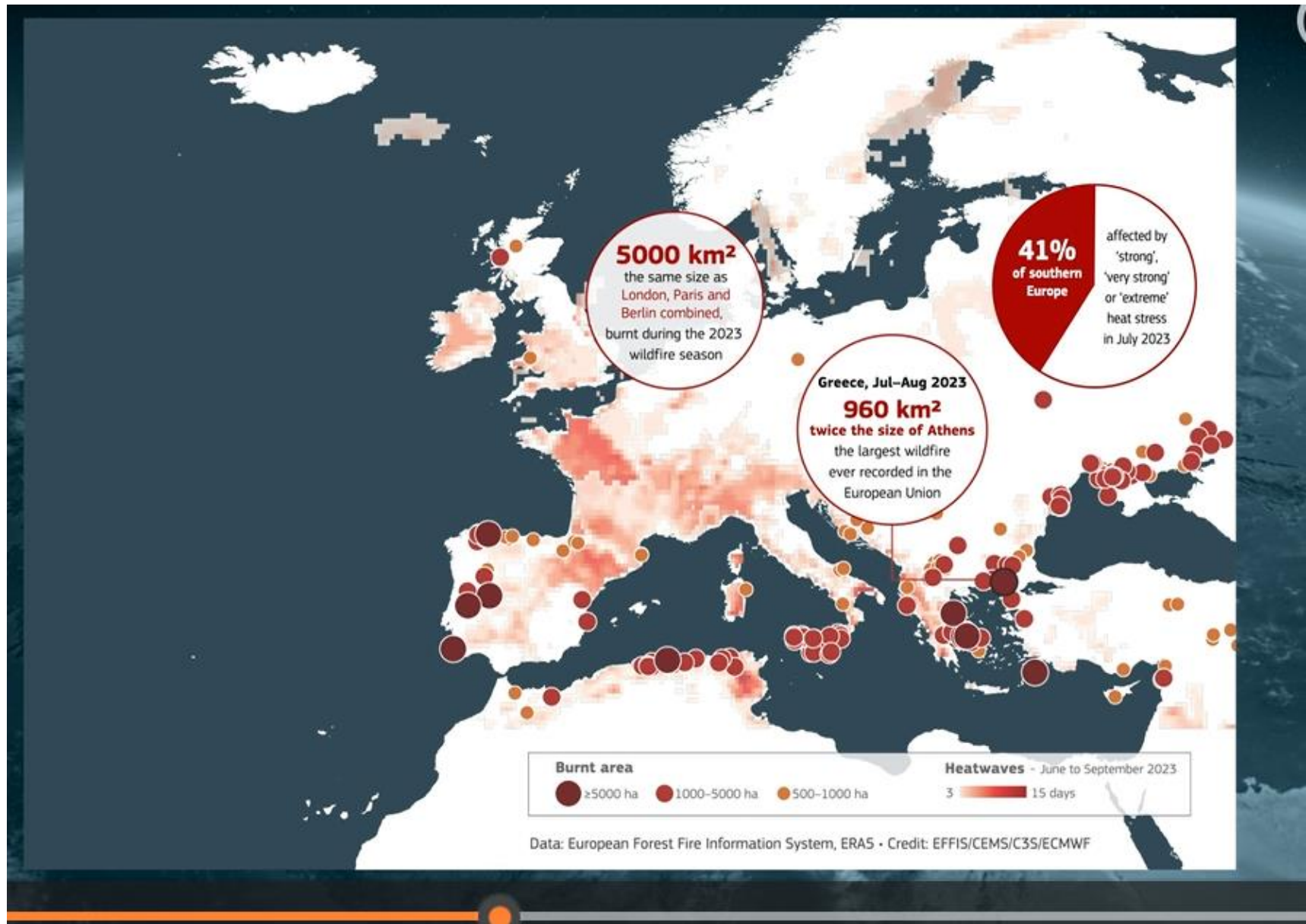
PROGRAMME OF
THE EUROPEAN UNION

Copernicus
European Copernicus logo

IMPLEMENTED BY
ECMWF

Summer 2023 was not the warmest on record, but saw several heatwaves across the continent.

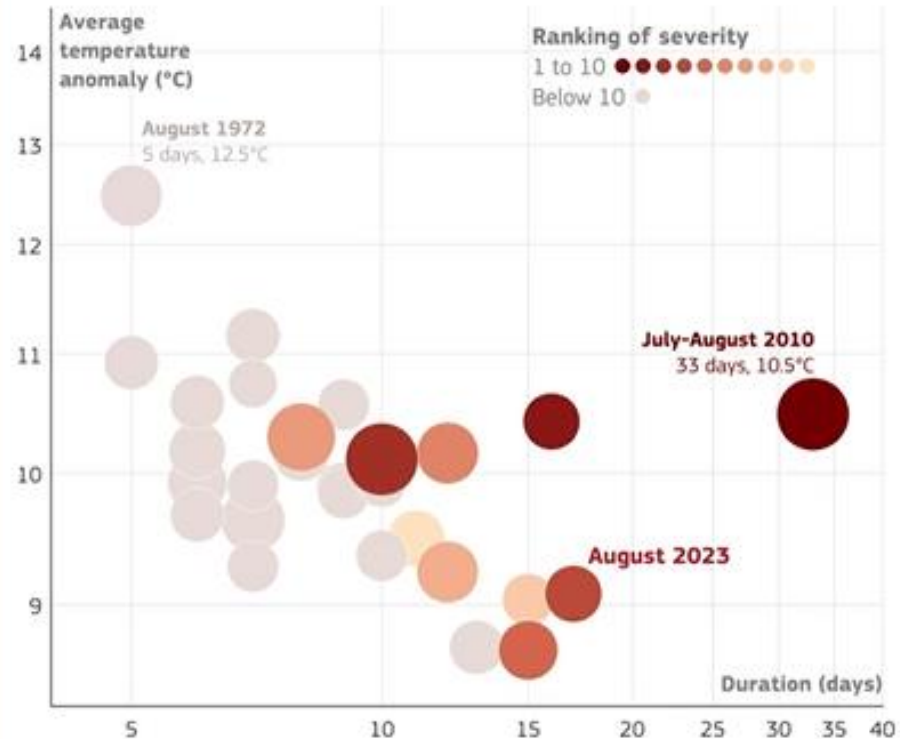
2023 saw a record number of days with 'extreme heat stress'.



Source: Copernicus Climate Change Service (C3S), 2024:
 European State of the Climate 2023, Full report:
climate.copernicus.eu/ESOTC/2023

Top 30 severe heatwaves in Europe (1950 – 2023)

The size of a circle is proportional to the area affected by the corresponding heatwave. Select one to find out more information. A logarithmic scale is used on both axes.



Heatwaves are defined as periods when the maximum temperature exceeded the 98th percentile of the 1961-1990 reference period, and exceeded 28°C, for a period of three or more days.

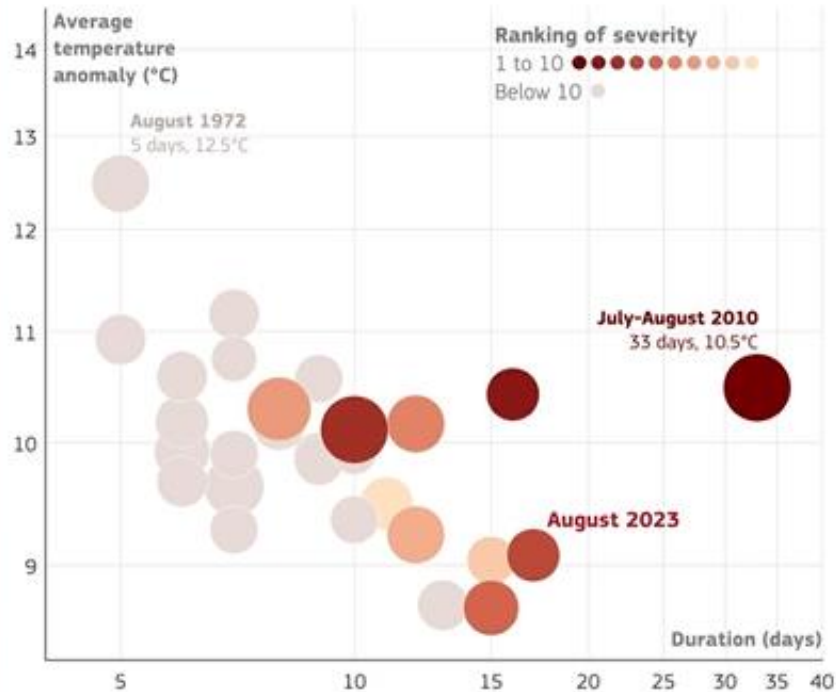
Data: E-OBS, SYNOP · Credit: DWD/C3S/ECMWF

Five of the most severe heatwaves in Europe have occurred in the last three years.

Source: Copernicus Climate Change Service (C3S), 2024: European State of the Climate 2023, Full report: climate.copernicus.eu/ESOTC/2023

Top 30 severe heatwaves in Europe (1950 – 2023)

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Data: E-OBS, SYNOP • Credit: DWD/C3S/ECMWF

In the last 20 years,
heat-related deaths
are estimated to
have increased in
most European
regions.

Source: Copernicus Climate Change Service (C3S), 2024:
European State of the Climate 2023, Full report:
climate.copernicus.eu/ESOTC/2023

There is potential for further development and refinement of tailored climate products for the health sector.

Climate services provided to the health sector in Europe

Services provided by National Meteorological and Hydrological Services in the WMO RA VI European region

Provided Not provided No data

Data services



Climate monitoring



Climate analysis and diagnostic



Tailored products



Climate change projections



Climate predictions



Percentages are based on the 50 European Members

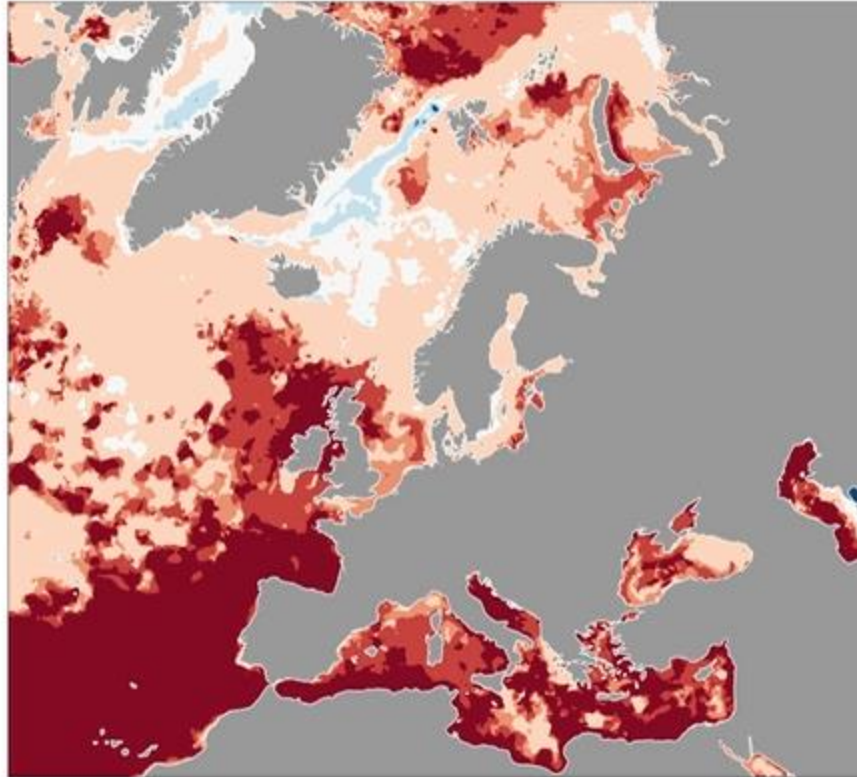
Source: WMO Climate Services Dashboard

Source: Copernicus Climate Change Service (C3S), 2024:
European State of the Climate 2023, Full report:
climate.copernicus.eu/ESOTC/2023

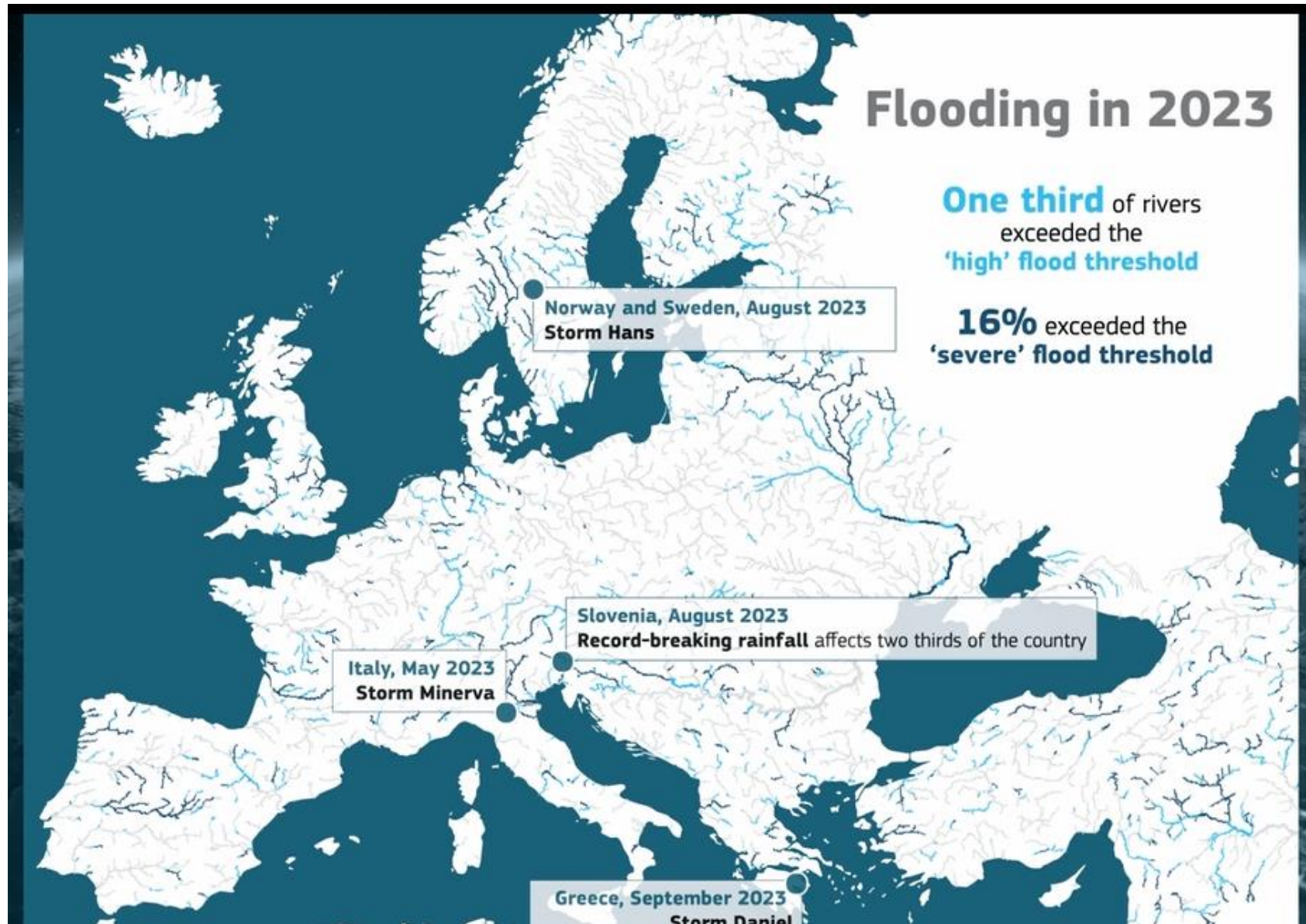
Ranking of sea surface temperatures in 2023

Data: ESA SST CCI Analysis v3.0 • Data period: 1980–2023 (44 years)

Credit: ESACCI/EOCIS/UKMCAS/C3S/ECMWF

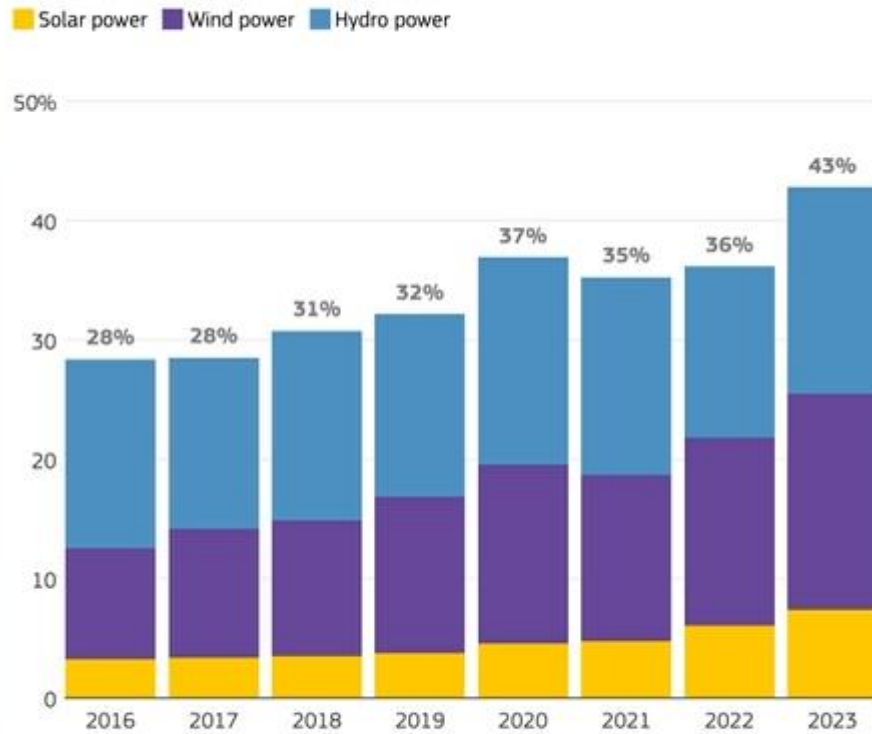


The average sea surface temperature for the European ocean was the highest on record in 2023.



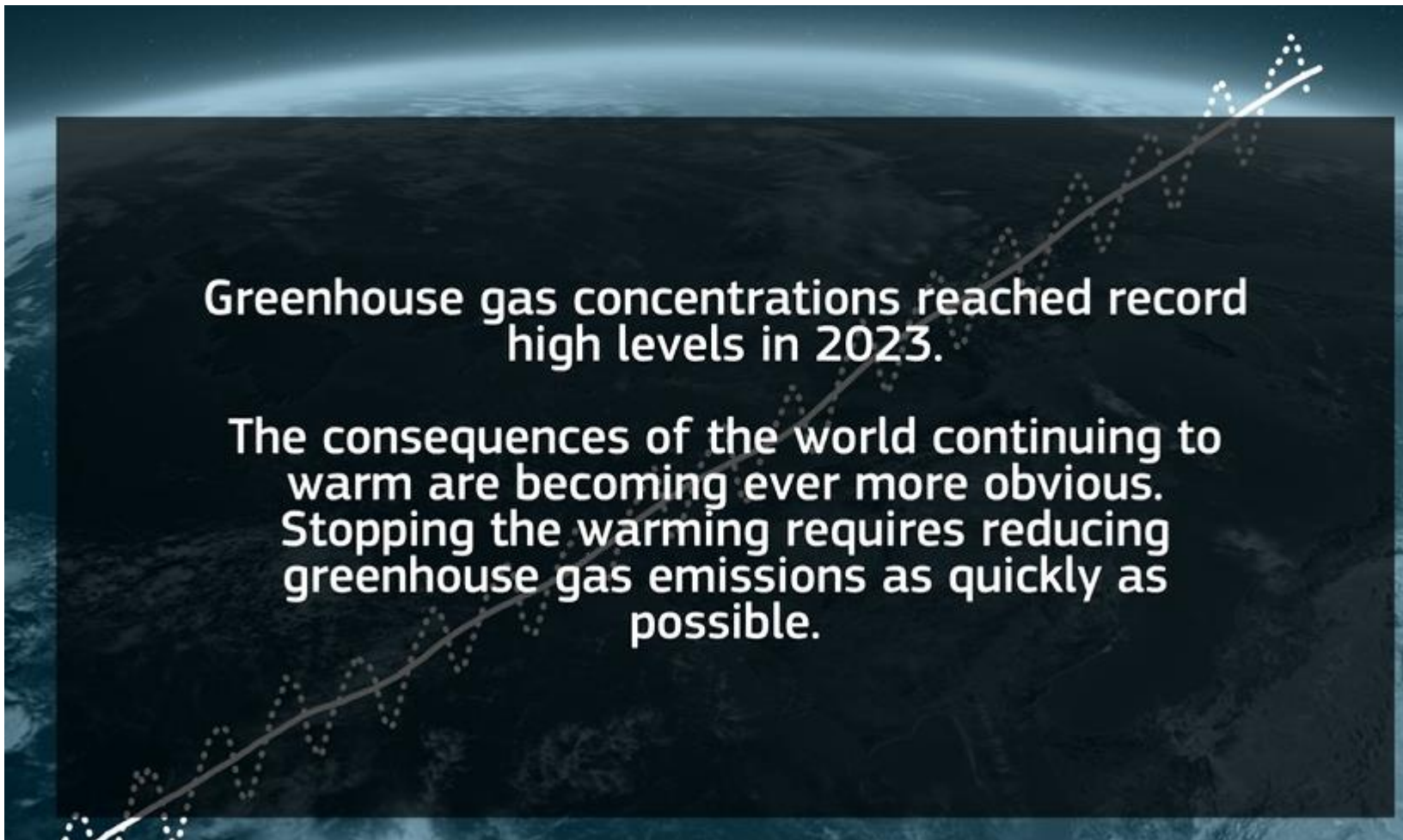
Source: Copernicus Climate Change Service (C3S), 2024:
European State of the Climate 2023, Full report:
climate.copernicus.eu/ESOTC/2023

Percentage of the total annual actual electricity generation for Europe from different sources

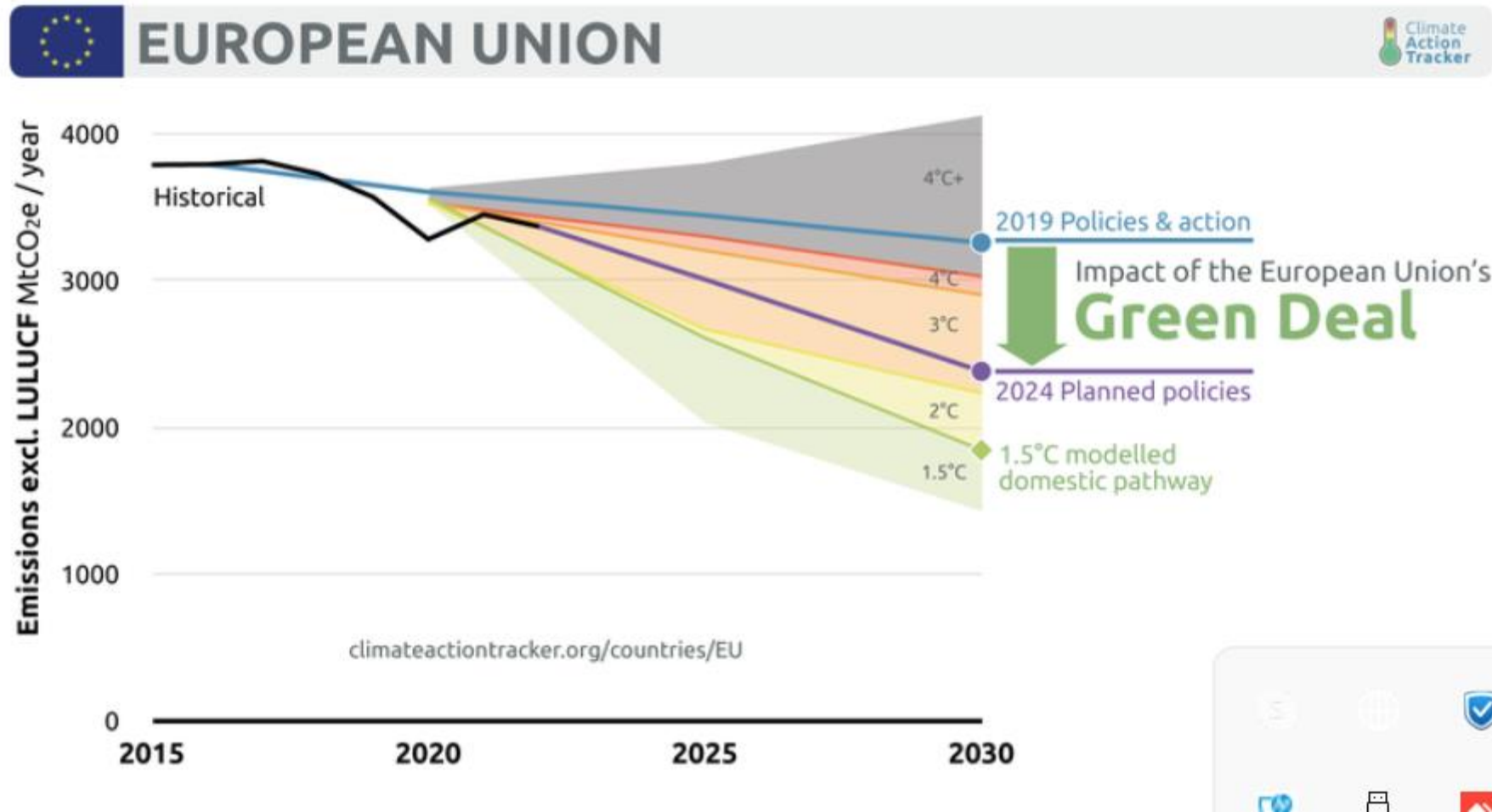


Data: ENTSO-E and Elexon - Credit: C3S/ECMWF

2023 saw a record proportion of actual electricity generation by renewables in Europe, at 43%.



Source: Copernicus Climate Change Service (C3S), 2024:
European State of the Climate 2023, Full report:
climate.copernicus.eu/ESOTC/2023



Source: Climate Action Tracker, online, <https://climateactiontracker.org/countries/eu/>

Is there an urgency?



Who we are ▾

Where we work ▾

What we do ▾

Publications & data



The Climate Emergency

The science is clear. The world is in a state of climate emergency, and we need to shift into emergency gear. Humanity's burning of fossil fuels has emitted enough greenhouse gases (GHGs) to significantly alter the composition of the atmosphere and average world temperature has risen between 1.1 and 1.2°C.

Africa contributes to only 2-3% of global greenhouse (GHG) emissions, yet it is the most vulnerable region to climate change's impacts. For every degree in rising temperatures, the cost of adaptation will rise exponentially. Africa will require USD 52.7 billion per year for the next 20 years to reduce its climate vulnerability. Current investments in adaptation are insufficient and hard limits are approaching in Africa.

Temperature records that were not meant to be broken have fallen, one after the other, day by day...meeting the goals of the Paris Agreement would require greenhouse gas emissions to be halved by 2020 and net zero emis

Source: UNEP, <https://www.unep.org/climate-emergency>

4.1 The Timing and Urgency of Climate Action

Deep, rapid, and sustained mitigation and accelerated implementation of adaptation reduces the risks of climate change for humans and ecosystems. In modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot and in those that limit warming to 2°C (>67%) and assume immediate action, global GHG emissions are projected to peak in the early 2020s followed by rapid and deep reductions. As adaptation options often have long implementation times, accelerated implementation of adaptation, particularly in this decade, is important to close adaptation gaps. (*high confidence*)

Source: IPCC (2023)

A person wearing a red traditional outfit is walking on a high wire or tightrope. The background shows a vast, green mountainous landscape under a cloudy sky. A white text box is overlaid on the image, containing the text: "CLIMATE CHANGE IS CLAIMING LIVES AND LIVELIHOODS. WORLDWIDE. TODAY." The image also features a network of white lines connecting several blue and pink dots, overlaid on the landscape.

**CLIMATE CHANGE IS CLAIMING LIVES
AND LIVELIHOODS. WORLDWIDE. TODAY.**

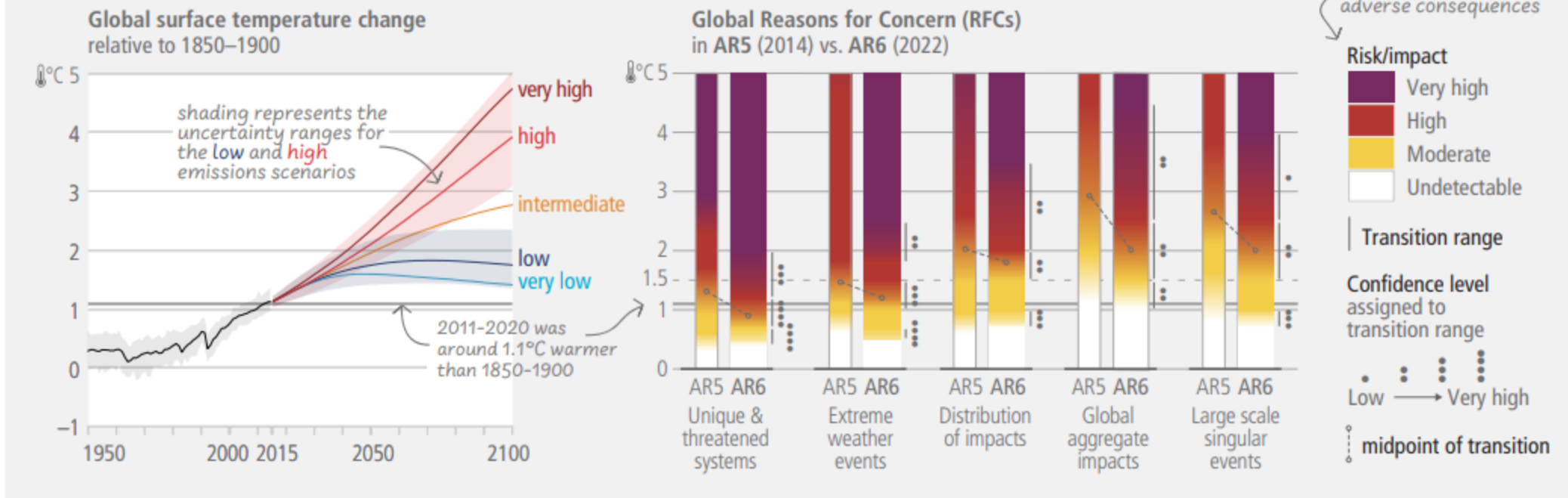
Source: <https://www.lancetcountdown.org/about-us/interact-with-the-key-findings/>

Climate change: An 'existential threat' to humanity, UN chief warns global summit



Risks are increasing with every increment of warming

a) High risks are now assessed to occur at lower global warming levels



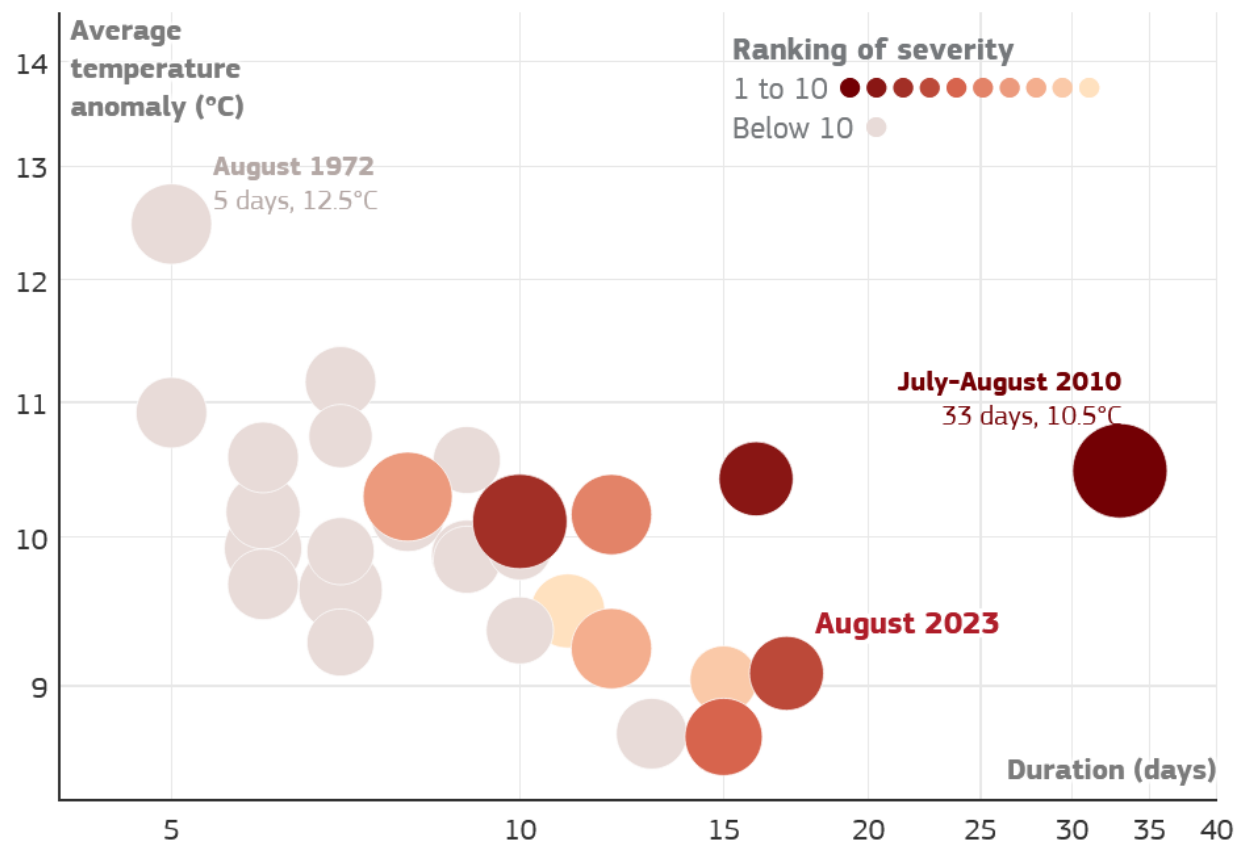
Source: IPCC, AR6, <https://www.ipcc.ch/report/ar6/syr/figures/figure-3-3>

Climate and health

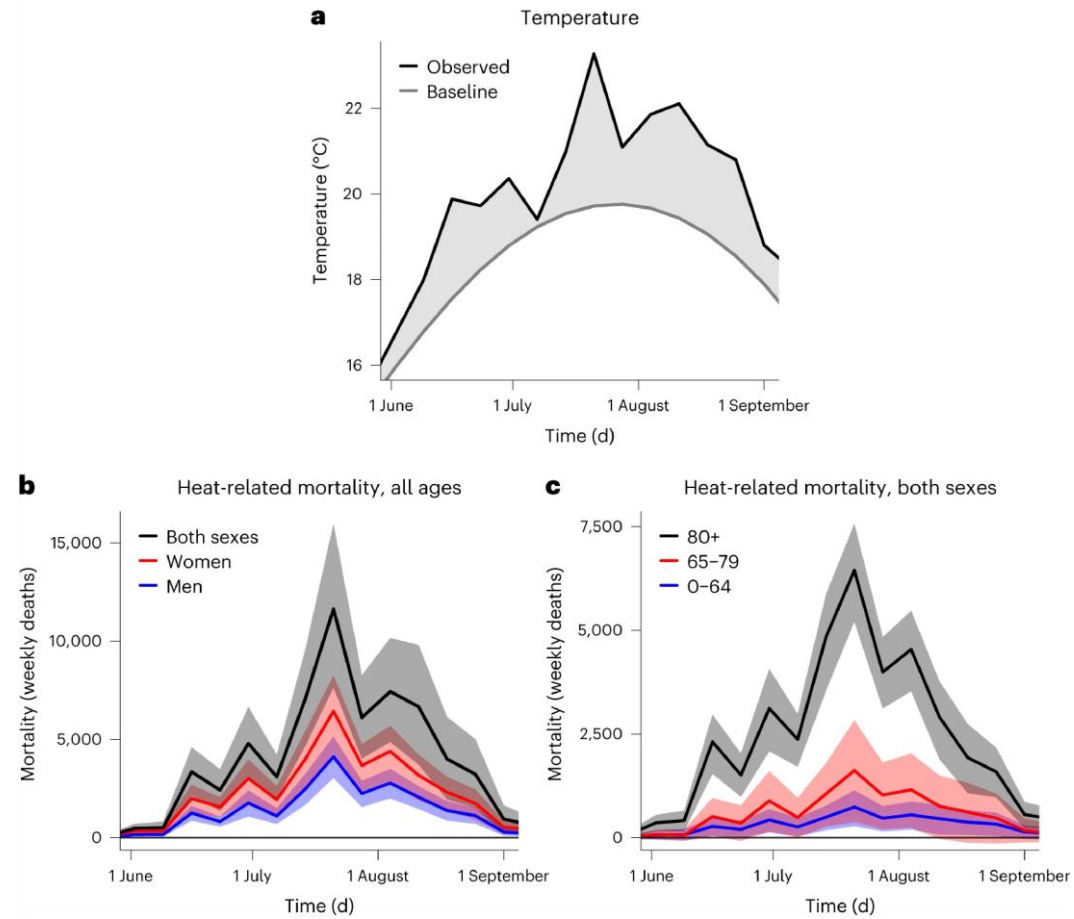
- The number of adverse health impacts related to extreme weather and climate events is rising.
- In July 2023, for the first time in history, the climate crisis and related extreme weather events were declared a public health emergency by the World Health Organization Europe Regional Office for Europe.
- Since 1970, extreme heat has been the leading cause of weather- and climate-related deaths in Europe, with a substantial increase since 2000.
- Heat-related mortality has increased by around 30% in the past 20 years and heat-related deaths are estimated to have increased in 94% of the nearly 1000 European regions monitored.
- Current heatwave interventions will soon be insufficient to deal with the expected heat-related health burden.

Source: Copernicus, <https://climate.copernicus.eu/esotc/2023/extreme-weather-and-human-health>

Top 30 heatwaves (1950-2023)



Source: Copernicus, <https://climate.copernicus.eu/esotc/2023/extreme-weather-and-human-health>



Source: Copernicus, <https://climate.copernicus.eu/esotc/2023/extreme-weather-and-human-health>

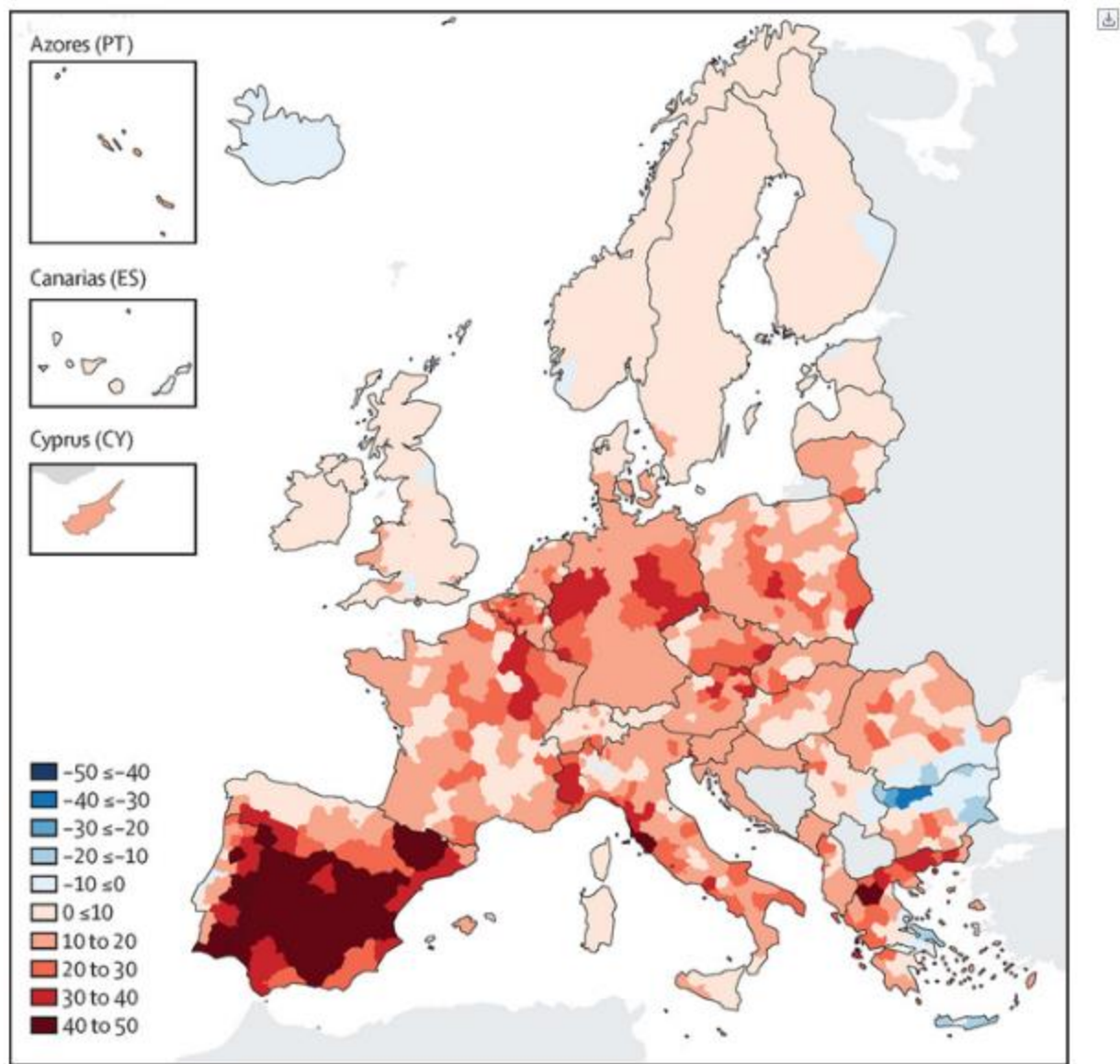


Figure 3. Trends in heat-related mortality incidence (annual deaths per million per decade) in Europe for the general population (2000–2020). Red shades indicate an increasing trend, and blue a decreasing trend. The darker the colour, the larger the trend. Credit: van Doalen, K. R., et al (2022).

Source: Copernicus

<https://climate.copernicus.eu/esotc/2023/extreme-weather->



Land devastated by drought

POPE

POPE FRANCIS

LAUDATE DEUM

LAUDATO SI

ENVIRONMENT

APOSTOLIC EXHORTATION

“Laudate Deum”: the Pope’s cry for a response to the climate crisis

Pope Francis has published an Apostolic Exhortation building on his 2015 encyclical. We’re not reacting enough, he says, we’re close to breaking point. He criticises climate change deniers, saying that the human origin of global warming is now beyond doubt. And he describes how care for our common home flows from the Christian faith.

THE POPE'S AGENDA

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Utility icons including a globe, a shield, a play button, a pencil, a heart, a USB drive, a red arrow, a book, and a camera.

Climate crisis



India
Delhi orders schools to close early for holidays as temperatures hit 47.4C

2h ago



Amazon rainforest
More than third of Amazon rainforest struggling to recover from drought, study finds

'Critical slowing down' of recovery raises concern over forest's resilience to ecosystem collapse



Oil and gas companies
Green activists push Biden to freeze 'disastrous' deepwater oil export rigs

Sensing election-year traction, coalition of 20 environmental groups also demand entrenchment of pause in gas-export licences

New South Wales
New rules for NSW polluters to require 'credible' plan for mitigating climate impact

Afghanistan
Fresh floods in Afghanistan kill at least 60 after heavy rain brings devastation

Germany
Eight climate activists arrested in Germany over airport protest

Twenty photographs of the week
The week around the world in 20 pictures



All stories

Twitter

Facebook

Southern frontlines: Latin America and the Caribbean
Honduran city's air pollution is almost 50 times higher than WHO guidelines

Climate crisis
Economic damage from climate change six times worse than thought - report

Shell
Shell urged to clarify climate targets as it braces for shareholder rebellion

Opinion

|| Britain's public parks are a green lifeline - stop fencing them off for the summer
Rebecca Tamás



The Guardian view on net zero: a bank-led green transition won't

|| The 1.5C global heating target was always a dream, but its demise doesn't signal doom for climate action
Bill McKibben

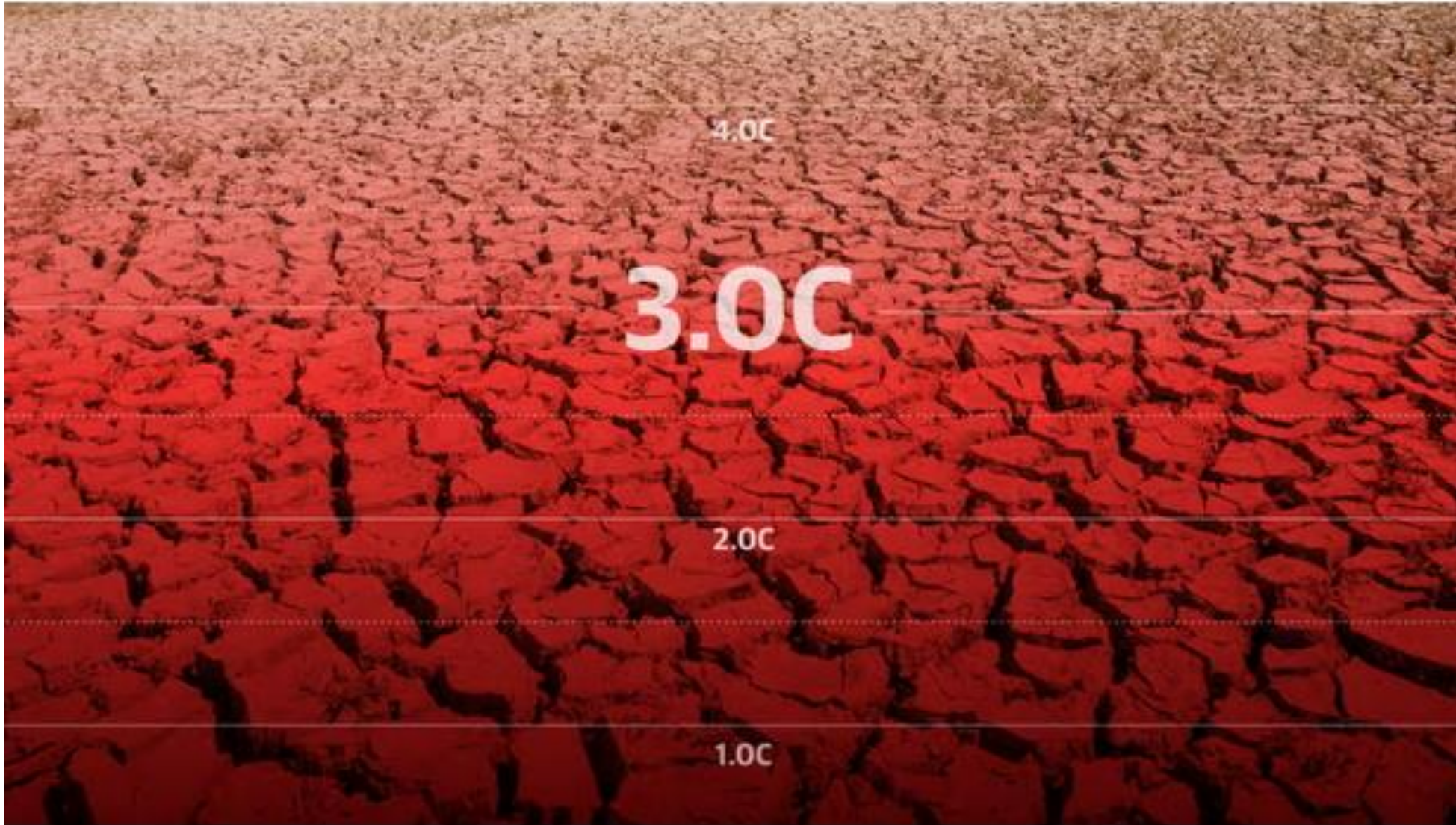


359



It's not all doom and gloom when it comes to the climate

Hide



📺 'Every tenth of a degree matters,' said one expert. Composite: Ashley Cooper/Global Warming mages

Source: Guardian, Climate crisis explainer, <https://www.theguardian.com/environment/article/2024/may/11/brutal-heatwaves-submerged-cities-what-3c-world-would-look-like>

4C

At 2C

The brutal heatwave that struck the The Pacific north-west in 2021 would be 100-200 times more likely. The increases in direct flood damage around the world doubles at 2C.

3C

2C

1C

Flames from the Lava fire, near California, 2021. Credit: Stoddard/Grants Pass Daily Courier

Predictions at various degrees celsius above preindustrial level

4C

3C

2C

1C

At 2.7C

Two billion people would be pushed outside humanity's "climate niche", ie the benign conditions in which the whole of civilisation arose over the past 10,000 years.

Marooned flood victims grab the side bars of a helicopter in Pakistan, 2010. Photograph: Adrees Latif

4C

3C

2C

1C

At 3C and above

The impact of climate shocks in one place will cascade around the world, through food price spikes, food and water shortages, broken supply chains, and refugees by the millions.

People from Africa seeking asylum being rescued by an Italian navy ship in 2014. Photograph : Massimo Sestini

Who will pay?

- Necessary investment. 3-6 times current (until 2030), IPCC
- EU: 2023 losses: 13.4 billion€ (Copernicus)
77 billion € (World Bank), up to 7% GDP

cost of climate adaptation

€34 - €110 per person per year

climate change adaptation costs up to the 2030s

€15 billion to €64 billion annually (adaptation finance between 0.1 and 0.4 percent of EU GDP).

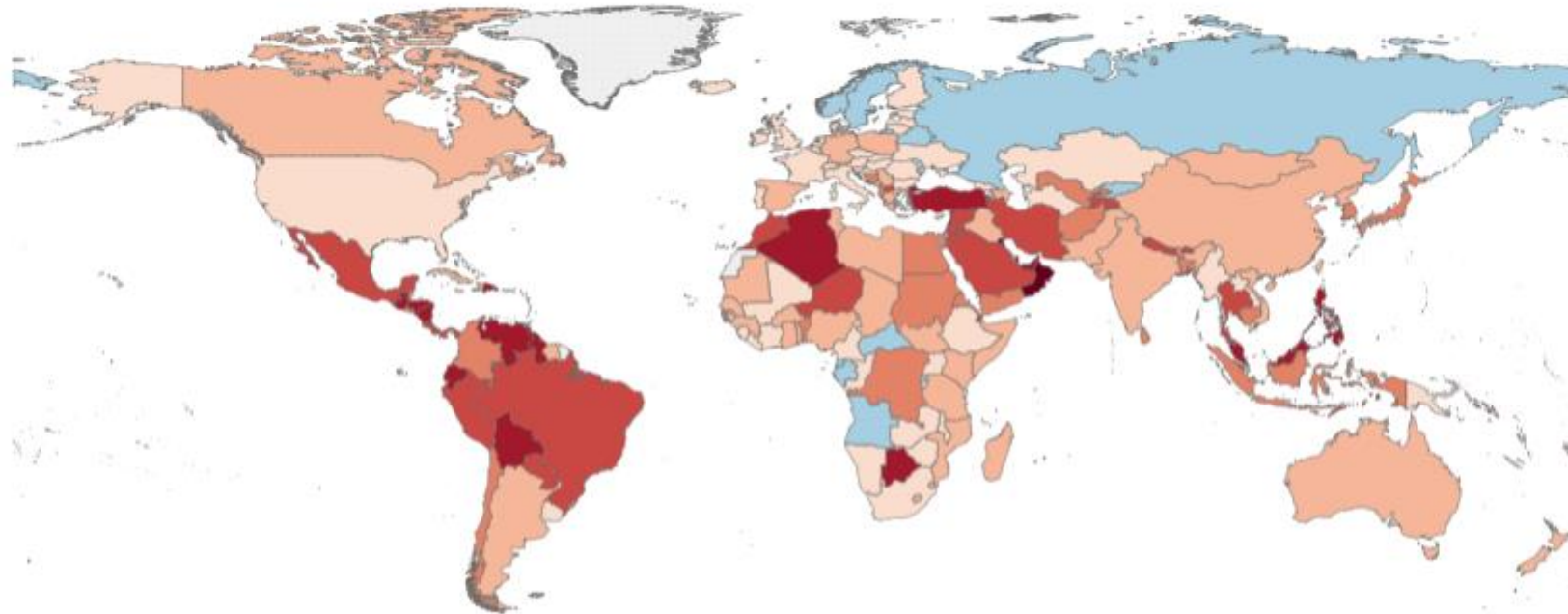
Percent change in annual heat-related deaths of adults over 65 years old in 2018-2022 compared to 2000-2004

Compares with counterfactual scenario in which temperatures are unchanged from baseline values

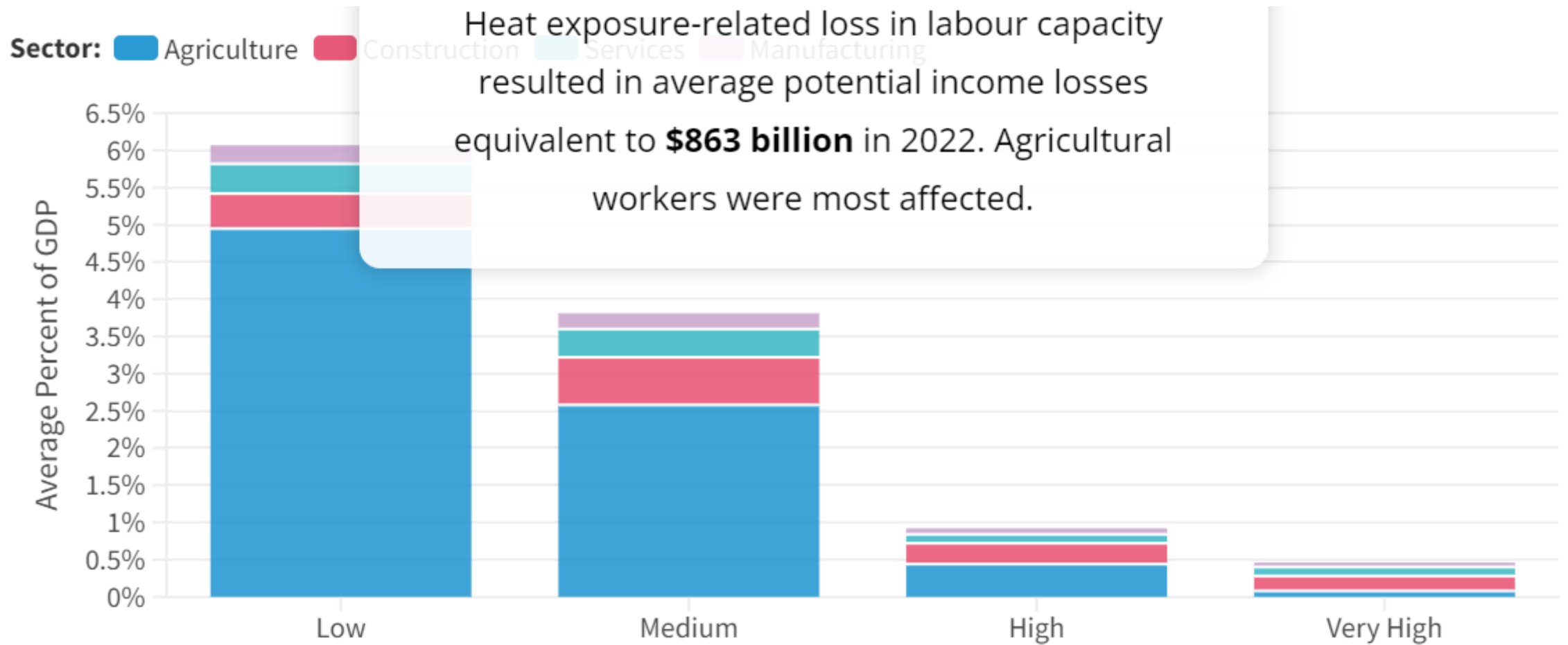
Estimated % change in heat-related mortality

% change expected with no temperature change

Percent change in annual deaths:



Source: 2023 Lancet Report, <https://www.lancetcountdown.org/about-us/interact-with-the-key-findings/>



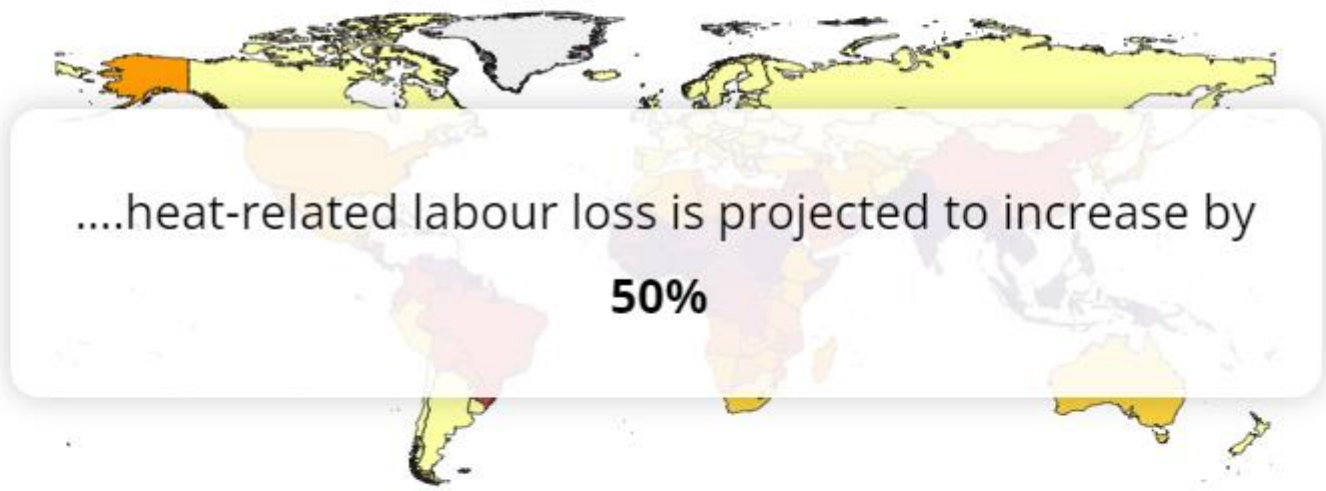
Source: Lancet Report, <https://www.lancetcountdown.org/about-us/interact-with-the-key-findings>

Emissions Scenarios:

Under 2° Scenario

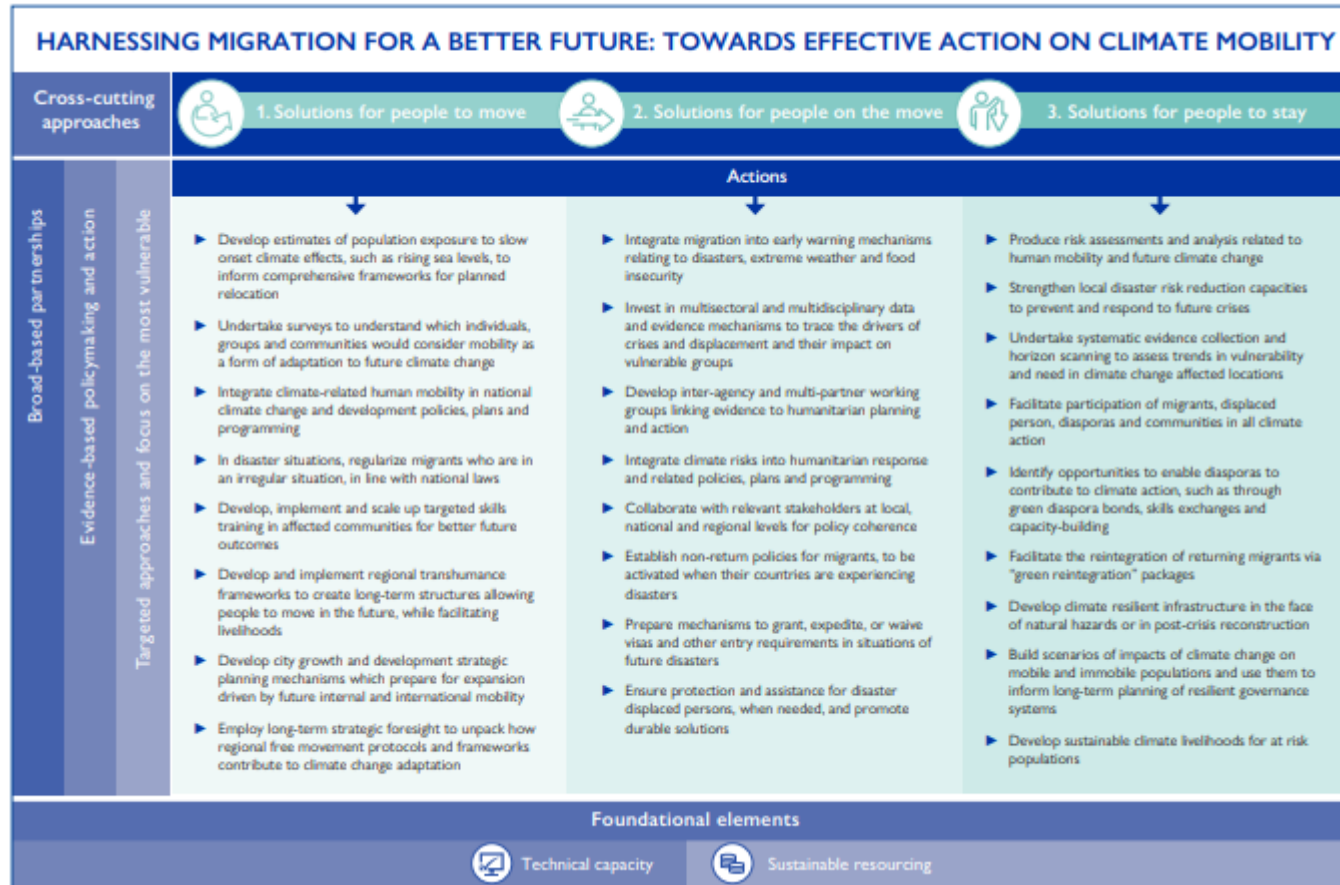
3.7° Scenario

Heatwave Exposure:



Source: Lancet Report,
<https://www.lancetcountdown.org/about-us/interact-with-the-key-findings/>

Climate migration



Source: International Organistaion for Migration (2022), <https://publications.iom.int/system/files/pdf/PUB2022-094-L%20COP27%20Policy%20paper%2020Oct22%20Final.pdf>

Solutions for people to move

- Labour migration, support adaptation
- Forward looking, small and developing islands
- Special measures for climate vulnerable people (e.g. from Haiti)

Source: International Organistaion for Migration (2022),
<https://publications.iom.int/system/files/pdf/PUB2022-094-L%20COP27%20Policy%20paper%2020Oct22%20Final.pdf>

Solutions for people on the move

- Improving migrants health
- Regional cooperation
- Reducing conflicts over natural resources

Source: International Organization for Migration (2022),
<https://publications.iom.int/system/files/pdf/PUB2022-094-L%20COP27%20Policy%20paper%2020Oct22%20Final.pdf>

Solutions for people to stay

- Community engagement
- Diaspora engagement (for resilience and adaptation)
- Green communities for locals and returnees

Source: International Organization for Migration (2022),
<https://publications.iom.int/system/files/pdf/PUB2022-094-L%20COP27%20Policy%20paper%2020Oct22%20Final.pdf>