

# Global warming facts for Europe and the Globe

What is the state of climate change? The Copernicus Climate Change Service is the EU's means of communicating information to EU citizens. Each year it issues a report on the state of play and these are some edited highlights from the document.



THE Copernicus Climate Change Service (C3S) provides climate monitoring for the globe, Europe and the Arctic, and annually releases the European State of the Climate (ESOTC) report.

Their report for 2022 includes a short overview of the global context, a more comprehensive overview of Europe, and a focus on the Arctic.

The report provides a detailed analysis of the past calendar year, with descriptions of climate conditions and events, and explores the associated variations in key climate variables from all parts of the Earth system.

## The climate picture

Globally, the last eight years have been the warmest on record, and 2022 was the fifth warmest year on record. Several regions of the globe saw record-breaking temperatures.

In Europe, summer was the warmest on record, at 1.4°C above average, and 0.3–0.4°C above the previous warmest summer, in 2021. Most of western Europe saw heatwave conditions and temperatures in the United Kingdom reached above 40°C for the first time. The average sea surface temperature across Europe's seas was the warmest on record.

The higher-than-average temperatures and a persistent lack of precipitation triggered a significant drought which, at its peak, affected most of Europe.

There was also record loss of ice from glaciers in the Alps, equivalent to 5 km<sup>3</sup> of ice, or an average depth across the glaciers of more than 3.5 m of ice.

The high temperatures and drought also facilitated the spread and intensification of large fires, resulting in the year as a whole seeing the second highest burnt area on record across the EU countries.

Both polar regions also experienced unusually warm conditions in 2022. Antarctic sea ice reached its lowest minimum extent on record in February. Later in the year, the Greenland ice sheet saw record melt, with at least 23% of its area impacted during one of three heatwaves in September.

## The Global picture

### Surface temperature

Globally, the last eight years were the warmest on record, although 2022 was one of the cooler of these.

Despite this, 2022 was the warmest year on record for several regions of the globe, including much of western Europe, parts of northwestern Africa, the Horn of Africa, central Asia and China, and much of the south Pacific.

The most-below-average temperatures over land were in southeastern Australia and central Canada.

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### Greenhouse gases

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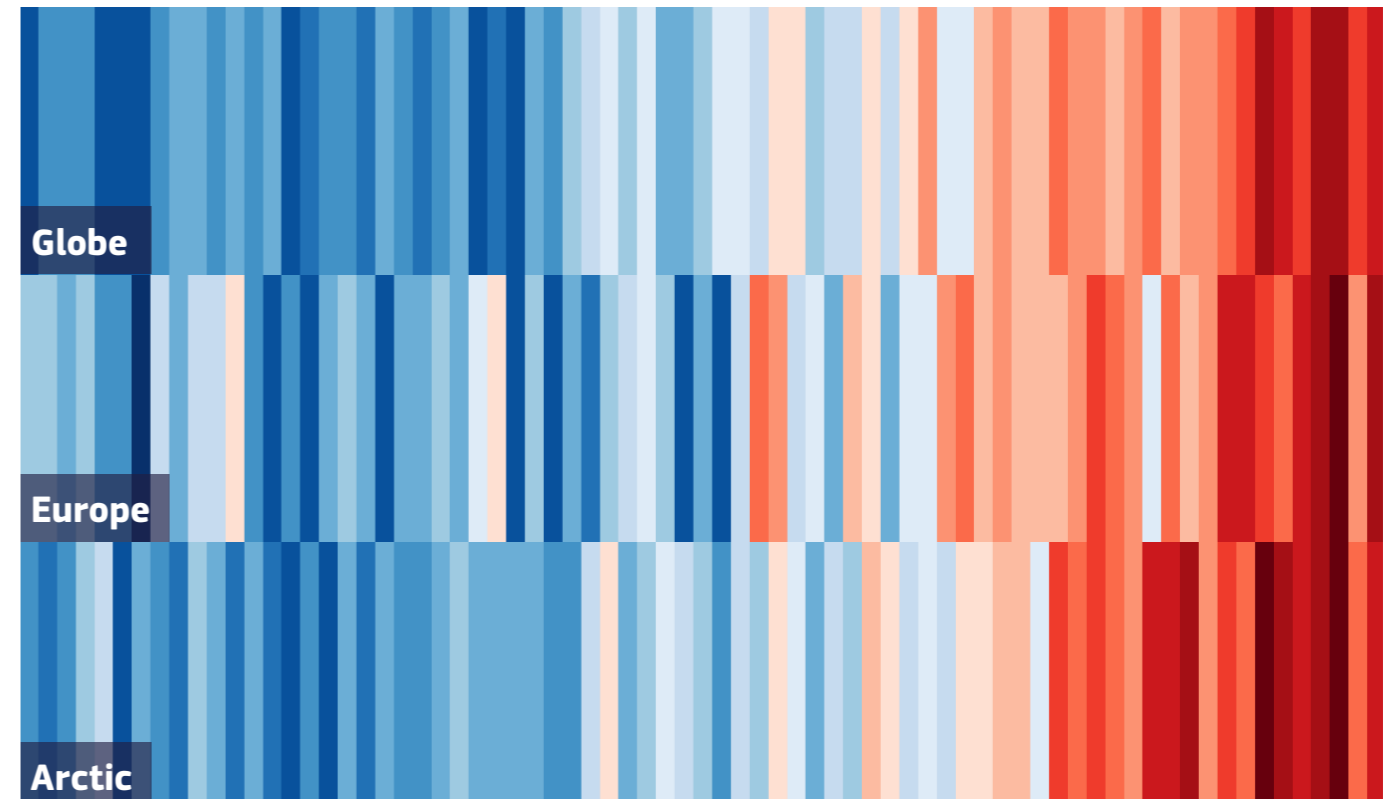
The year-on-year increase in methane was significantly higher than the average of the last ten years, but not as high as the record levels seen in 2020 and 2021.

### Sea surface temperature

Global average sea surface temperature (SST) was the sixth warmest on record, and 2022 marked the third year with La Niña conditions present. This meant that it was cooler than some recent years. Since 1850, SSTs have increased by 0.9°C, but the rate of increase varies regionally. Among the fastest warming areas are parts of the Arctic Ocean, the Baltic Sea, the Black Sea, and parts of the extratropical Pacific.

### Glaciers

Glaciers continued to lose mass at high rates and are estimated to currently contribute more than 1 mm per year to mean global sea level rise. A large reduction in glacier mass was observed across the globe, with only glaciers in southwestern Scandinavia showing a small gain in mass.



Climate stripes from ERA5, 1950–2022

### Sea ice

Sea ice extent in the Arctic remained slightly below average throughout the year. Antarctic sea ice extent reached its lowest minimum extent on record in February, with another five months seeing near-record low extent.

### Sea level

Data available for the first six months of the year show a continuing rise in global mean sea level, reaching a new record high.

### The European picture

#### Europe temperature

The summer temperature for Europe was the highest on record. 2022 was the second warmest year on record for Europe, at 0.9°C warmer than average. For many countries in southwestern Europe, the year was the warmest on record.

The most-above-average temperatures occurred in northeastern Scandinavia and those countries bordering the northwestern Mediterranean Sea.

Winter, summer and autumn were all warmer than average, and spring was slightly cooler than average, by 0.1–0.2°C. Summer was the warmest on record, at 1.4°C above average, and 0.3–0.4°C above the previous warmest summer, in 2021. The year was characterised by many more

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**"A lack of precipitation contributed to widespread drought conditions"**

warm than cool events. A long-term trend towards higher surface air temperatures continues.

### Lake & sea temperatures

Europe's lakes and seas are seeing increasing surface temperatures. The average sea surface temperature (SST) across Europe's seas was the warmest on record in 2022.

### Precipitation

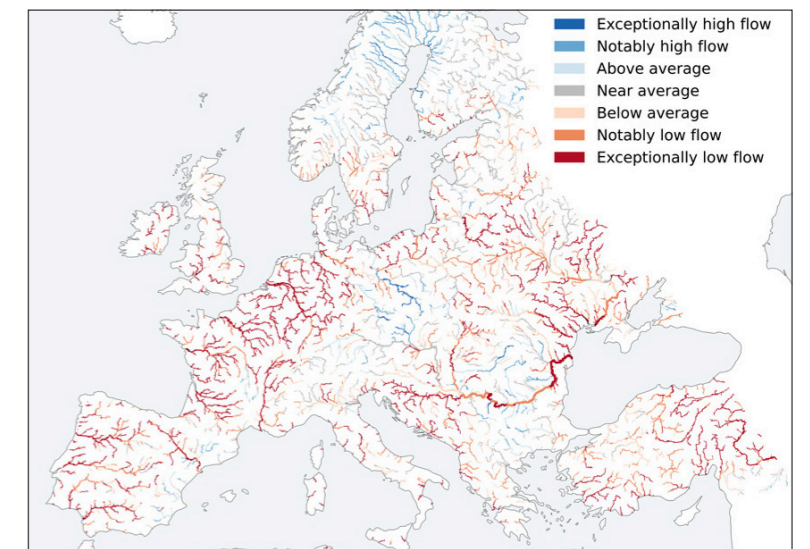
A lack of precipitation contributed to widespread drought conditions. The year as a whole was as much as 10% drier than

average. May was the driest month, with 21–28% less precipitation

### River discharge

For 10 months of the year, river discharge was below average, the second lowest on record across Europe, marking the sixth consecutive year of below-average flows. In the area affected, it was the driest year on record, with 63% of rivers seeing below-average flows.

In March, flows were the lowest on record, although April saw the most widespread high river flows, with 54% of the river network having above-average river discharge.



Monthly average river discharge anomalies for August 2022, relative to the 1991–2020 reference period. Rivers with drainage areas greater than 1000 km<sup>2</sup> are shown. Data source: EFAS. Credit: Copernicus EMS/ECMWF.