

Europe's climate warming at twice rate of global average, says report

Trend of faster warming over last 30 years likely to cause exceptional heat, wildfires and floods, warn scientists



Flooding in the Wye valley, Hereford, after Storm Dennis in 2020. Photograph: Christopher Furlong/Getty Images

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Wed 2 Nov 2022 14.00 GMT

Temperatures in **Europe** have increased at more than twice the global average in the last 30 years, according to a report from the World Meteorological Organization (WMO).

The effects of this warming are already being seen, with droughts, wildfires and ice melts taking place across the continent. The European State of the Climate report, produced with the EU's Copernicus service, warns that as the warming trend continues, exceptional heat, wildfires, floods and other climate breakdown outcomes will affect society, economies and ecosystems.

From 1991 to 2021, temperatures in Europe have warmed at an average rate of about 0.5C a decade. This has had physical results: Alpine glaciers lost 30

metres in ice thickness between 1997 and 2021, while the Greenland ice sheet has also been melting, contributing to sea level rise. In summer 2021, Greenland had its first ever recorded rainfall at its highest point, Summit station.

Human life has been lost as a result of the extreme weather events. The report says that in 2021, high impact weather and climate events – 84% of which were floods and storms – led to hundreds of fatalities, directly affected more than 500,000 people, and caused economic damages exceeding \$50bn.

“Europe presents a live picture of a warming world and reminds us that even well-prepared societies are not safe from impacts of extreme weather events,” said the WMO secretary general, Prof Petteri Taalas. “This year, like 2021, large parts of Europe have been affected by extensive heatwaves and drought, fuelling wildfires. In 2021, exceptional floods caused death and devastation.”

It also found that this trend was very likely to continue, with more weather disasters predicted in the future. It predicts that temperatures will rise in all European areas at a rate exceeding global mean temperature changes, similar to past observations. As the climate warms to 1.5C above pre-industrial levels, the weather events will accelerate, with ever-decreasing summer rainfall likely to cause devastating droughts. Extreme rain and flooding are likely to follow in the later months in all regions except the Mediterranean.

Though the report makes for grim reading, there is some good news. It notes that many European countries have been very good at cutting greenhouse gas emissions, and EU emissions decreased 31% between 1990 and 2020. Europe has also acted to protect people from the worst effects of the climate emergency, with extreme weather-warning systems protecting about 75% of people, while heat-health action plans have saved many lives.

“On the mitigation side, the good pace in reducing greenhouse gas emissions in the region should continue and ambition should be further increased. Europe can play a key role towards achieving a carbon-neutral society by the middle of the century to meet the Paris [climate] agreement,” said Taalas.

There are a number of reasons why Europe has warmed more quickly than other parts of the world. It has a high percentage of land mass, which warms

faster than sea. The Arctic and generally the high northern latitudes are also the fastest warming regions globally and a relatively large part of Europe is in the northern latitudes.

Feedback systems could also be contributing, such as dried-out soil moisture meaning temperatures rise faster, thus drying the soil more. Another example of feedback loops is Europe's vulnerability to double jet streams.

This "double" effect happens when a jet stream temporarily splits in two, leaving an area of weak winds and high-pressure air between the two branches that causes extreme heat. These double streams become more likely as land mass heats up in early summer.

A [study in Nature Communications](#) published earlier this year found that Europe was a "heatwave hotspot", partly because double jet streams account for about 35% of temperature variability.

Other scientists welcomed the report, pointing out that Europe's cities were "heat islands" and thus feel extreme temperatures more. Prof Daniela Schmidt, at the Cabot Institute and School of Earth Sciences, University of Bristol, said: "When global warming is reported, the focus is always on the global average, currently 1.1C. But there are large differences, with much of the ocean warming less, land more, and more the further to the poles you go. Our cities on top of this are heat islands, as many of us felt during this hot summer.

"In the UK, this summer's heatwave resulted in nearly 3,000 additional deaths among people over 65. Heat and droughts together impacted transport on European rivers, energy generation, our ecosystems and our people. These risks will only increase with every increment of warming and reducing these risks harder the longer we wait."