EMBARGO: Thursday 4 September, 12am Eastern Time (midnight)/ 6am Central European Summer Time

Climate change made hot, dry and windy weather that fueled the deadly wildfires in Spain and Portugal 40 times more likely

Urgent need to shift away from fossil fuels as as more than a million hectares burned across Europe, scientists warn

Human-caused climate change made the hot, dry and windy conditions that fueled the wildfires that killed eight people in Spain and Portugal about 40 times more likely, a rapid analysis has found.

The super rapid study by World Weather Attribution – which analysed weather observations but not climate models – highlights how simultaneous fires across Europe are overwhelming firefighting resources and the importance of controlling vegetation in areas affected by wildfires.

Key findings include:

- Intense fire-prone weather conditions are now about 40 times more frequent and around 30% more intense compared to the preindustrial climate.
- The ten-day heatwave was 200 times more likely and 3°C hotter because of climate change.
- Large population shifts from rural areas to cities has resulted in overgrown farms and forests, which is increasing the amount of fuel available for wildfires.

Dr Clair Barnes, Researcher at the Centre for Environmental Policy Imperial College London, said:

“The sheer size of these fires has been astonishing. In just one week, fires in Spain burned more than 175,000 hectares – more than double the annual average for an entire wildfire season since 2006. Portugal has also seen massive fires with nearly 3% of the country burned.

“Hotter, drier and more flammable conditions are becoming more severe with climate change, and are giving rise to fires of unprecedented intensity.

“Unfortunately, these fires are a sign of what is to come. With every fraction of a degree of warming, extreme, long-lasting heatwaves will continue to intensify, increasing the chance of huge wildfires like the ones that burned vast areas of the Iberian Peninsula.”

The wildfires broke out at the end of July. Fueled by temperatures pushing above 40°C and strong winds, the flames spread extremely rapidly. In Spain, more than 380,000 hectares have burned – nearly five times the annual average. Portugal has lost more than 260,000 hectares, close to 3% of its landmass and close to three its yearly average. The burned area across the countries makes up around two-thirds of Europe’s total burned area, which surpassed a million hectares in August for the first time since records began in 2006.

At least eight people were killed by the fires, tens of thousands of people were forced to evacuate, and smoke led to dangerous air quality in Spain and Portugal and travelled as far as France, the UK, and Scandinavia. A section of the Camino de Santiago pilgrimage route was also closed due to fires spreading into the Picos de Europa mountains.

The study focused on the weather conditions that enabled the explosive spread of the fires, including Spain's hottest ten consecutive days on record.

Climate change, caused primarily by the burning of fossil fuels, intensified the weather that drove the fires, the scientists found. Before climate change, similar ten-day spells of hot, dry and windy conditions would also be incredibly rare, expected once every 500 years. However, as a result of fossil fuel-driven warming, they are now expected every 15 years. Climate change made the fire-prone weather about 40 times more likely and 30% more intense.

The scientists also analysed the heatwave. In a world without climate change, similar heatwaves would be expected less than every 2,500 years. But today, with 1.3°C of warming, they are much more likely, expected every 13 years. Overall, climate change made the heat about 200 times more likely and 3°C hotter.

Together, the results reflect a rapidly increasing risk of huge, hard-to-control wildfires in Spain and Portugal. Fire-prone weather conditions will continue to intensify across Europe until rising global temperatures are halted by a complete shift to renewable energy from fossil fuels, the researchers say.

The analysis is not a full attribution study, as the scientists analysed weather observations but did not use climate models. However, the results agree with science focusing on wildfires in the region and a full attribution analysis on the recent wildfires in Türkiye, Greece and Cyprus. It found climate change made the hot, dry and windy conditions about 10 times more likely and 22% more intense.

The study highlights the current strain on firefighting resources in Europe. On August 13, as fires raged, Spain made its first ever request for international firefighting reinforcements to the European Civil Protection Mechanism. The deployment of firefighters was described by Spain's President as the largest ever facilitated by the EU. In the same week, requests for firefighting assistance were also made by Greece, Bulgaria, Albania and Montenegro as fires tore through the eastern Mediterranean.

Both Spain and Portugal have seen large population shifts from rural to urban areas, resulting in abandoned and overgrown forests and farms. The researchers say strategies to manage the amount of fuel available for wildfires will reduce the risk of similar events, such as prescribed burns, removal of vegetation using machinery, and encouraging grazing by sheep, horses and goats.

The study was conducted by 13 researchers as part of the World Weather Attribution group, including scientists from universities and meteorological agencies in Türkiye, Greece, the Netherlands, the United Kingdom and the United States.

Theodore Keeping, Researcher at the Centre for Environmental Policy Imperial College London, said:

"Wildfires are reaching new extremes in Spain and Portugal. Firefighters are increasingly working in chaotic and unpredictable conditions, tackling fires that behave in ways they've never seen before.

"The most intense wildfires can create their own wind, leading to longer flame lengths, explosive outbreaks and the ignition of dozens of fires nearby from flying embers.

"Climate change is fueling more extreme wildfires, but adaptation isn't keeping pace. We need to see a shift in thinking and a greater focus on prevention."

Prof Friederike Otto, Professor in Climate Science at the Centre for Environmental Policy, Imperial College London, said:

“Spain is being hit hard by climate change. These enormous fires follow the devastating floods in Valencia and another summer of relentless heat above 40°C.

“Extreme weather is becoming more frequent, but deaths and damages are preventable. Every level of government must work together to adapt to climate change. For wildfires, there’s an urgent need to control vegetation in rural areas, particularly land that has been abandoned by farmers and shepherds.

“Ultimately, though, the world needs to stop burning oil, gas and coal. The wildfires in Europe show that 1.3°C of warming today is already incredibly dangerous. Without a faster shift away from fossil fuels, we could hit 3°C this century. Wildfires at this level would be catastrophic.”

Maja Vahlberg, Technical Advisor at Red Cross Red Crescent Climate Centre, said:

“Spain’s first-ever request to the EU for firefighting reinforcements highlights the enormous resources now required to tackle more intense blazes.

“Even with hundreds of firefighters and dozens of planes, wildfires still burned more than 320,000 hectares over two weeks in Spain.

“In Europe, there is a growing recognition of the need to reduce fuel loads with controlled burns and vegetation clearing to minimise wildfire danger.”

Dr David Garcia, Senior Lecturer at the Applied Mathematics and Aerospace Engineering Department of the University of Alicante in Spain, said:

“It seems that public opinion in Spain has focused on the fact that the problem lies only in the decline of rural activities, with the resulting growth of vegetation that has fuelled the fires. However, much less has been said about the effect of climate change on these fires, which, as has been demonstrated, has been immense.

“It could take centuries to get back to the cooler preindustrial climate. However, we must not forget that every fraction of a degree will make the conditions for major fires like those seen this summer even more likely. That’s why it is so important that greenhouse gas emissions are reduced as quickly as possible.”

Prof Ricardo Trigo, Associated Professor at the Geophysics, Geographical Engineering and Energy Department, University of Lisbon, said:

“The most affected areas by the 2025 summer fires, namely Portugal and northwestern Spain’s Galicia region, correspond to the most wildfire-prone zone in Europe because of both natural and human drivers. Unlike most other parts of Iberia, the northwestern sector of the Peninsula receives a significant amount of rain between October and March, which allows fuels to grow more than in the hotter southern and eastern sectors. Yet, like the rest of Iberia, the northwest suffers regularly from very dry and hot summers.

“As in previous catastrophic summers such as 2003, 2005, and 2017, the large fires in August 2025 in Portugal were fuelled by particularly favourable meteorological conditions – dry, hot, and often windy. These weather patterns are very difficult to fight during large fires, especially across the steep terrain that characterizes northern Portugal and Galicia.

“From a human perspective, most of these rural areas have suffered massive abandonment since the 1970s, which has allowed fine fuels to accumulate to dangerous levels, a problem worsened by inadequate forestry management. Finally, despite a significant decline in fire ignitions in Portugal over the last 20 years, the fire risk remains very high, in part due to negligent and arsonist use of fire.”

Sara Casas, Environment and Climate Change Program Manager at Spanish Red Cross, said:

“The Spanish Red Cross is witnessing firsthand how the climate crisis is fueling more frequent and devastating wildfires, forcing thousands of people to evacuate their homes and putting entire communities at risk. Beyond emergency response, we are working to strengthen prevention and resilience from awareness and risk reduction campaigns in vulnerable communities to large-scale reforestation and ecosystem restoration projects led by our volunteers.

“These initiatives not only reduce CO2, but also help reduce fuel loads and create healthier, more resilient landscapes. While climate change is making megafires more likely, we know that coordinated action and long term adaptation measures can save lives and protect our environment.”

Marta Neves, Climate Action Focal Point at Portuguese Red Cross, said:

“In response to the increasingly severe wildfires of recent years, the Portuguese Red Cross has been actively supporting both the operational staff on the frontlines – such as firefighters and other civil protection agents – by improving their working conditions through the provision of dignified rest spaces where they can sleep, eat, and maintain proper hygiene. At the same time, it has been assisting affected communities, many of whom have lost their livelihoods, in the recovery phase by helping them restore stability and rebuild their lives.

“While climate change has undeniably amplified the scale and intensity of these fires, it is also important to acknowledge that most wildfires are catalysed by negligent human actions. This reality highlights the urgent need to strengthen community awareness and prevention efforts, fostering a shared responsibility to protect people, nature, and our common future.”

Notes

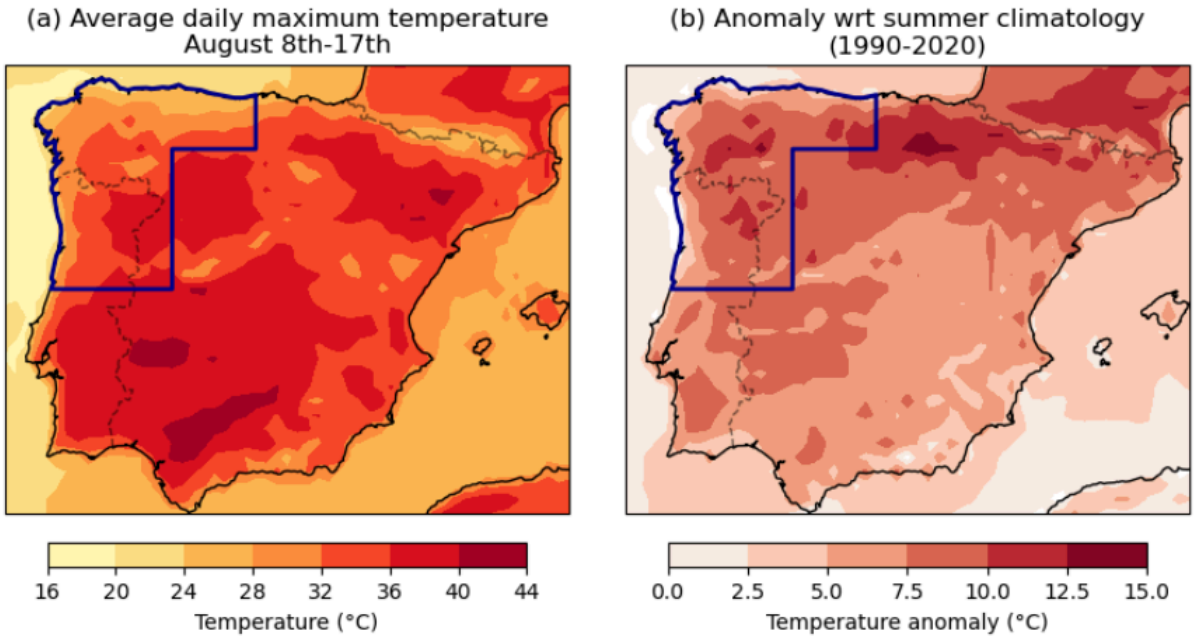
Burned area statistics
The burned area statistics reported are taken from the European Forest Fire Information System.

Methods
Scientists globally agree that climate change is increasing the risk of wildfires starting and spreading as persistent heat dries out soils and vegetation, creating more flammable conditions.

To investigate the effect of climate change on the wildfires in Spain and Portugal, the scientists analysed weather data using peer-reviewed methods to compare how these types of events have changed between today’s climate, with approximately 1.3°C of global warming, and the cooler pre-industrial climate. The study focused on a northwestern region of the Iberian Peninsula.

The scientists analysed the Daily Severity Rating (DSR), a metric that considers temperature, humidity, wind speed and precipitation to estimate the potential intensity of a wildfire and how difficult it will be to extinguish. They also analysed maximum temperatures to understand how climate change affected the heat. The study focused on the ten most intense days of the DSR each year and the ten hottest days each summer.

Study region
The region analysed is shown in the blue box below.



Study webpage

The study “Extreme fire weather conditions in Spain and Portugal now common due to climate change” will be published on Thursday 4 September at 12am Eastern Time (midnight)/ 6am Central European Summer Time. When the embargo lifts, the study will be available at:

https://www.worldweatherattribution.org/extreme-fire-weather-conditions-in-spain-and-portugal-now-common-due-to-climate-change

World Weather Attribution

World Weather Attribution is an international collaboration that analyses and communicates the possible influence of climate change on extreme weather events, such as storms, extreme rainfall, heatwaves, and droughts.

The group has completed more than 110 studies on a range of extreme weather events around the world using peer-reviewed methods. To date, 27 of these studies have been submitted and published in peer reviewed journals and their results have remained unchanged.

The Intergovernmental Panel on Climate Change included research by World Weather Attribution to provide evidence that human-caused climate change is already intensifying weather extremes in every region of the world in its Sixth Assessment Report published in March, 2023.

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