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Thursday 28 August, 4am British Summer Time / 6am Eastern European Summer Time

Climate change made weather that drove deadly wildfires in Türkiye, Greece and Cyprus 22% more intense

Researchers expect similar results for blazes in Spain and warn of more dangerous fires with ongoing fossil fuel burning

Human-caused climate change made the weather conditions that drove deadly fires in Türkiye, Greece and Cyprus about 22% more intense, a rapid analysis has found.

The study by World Weather Attribution follows data confirming 2025 has become Europe's worst recorded year of wildfires with more than one million hectares burned. The researchers warn the risk of larger and harder-to-control fires will continue to increase if countries keep burning fossil fuels.

Key findings include:

- Climate change set the scene for the fires by influencing the weather in the months, weeks and days leading up to them.
- Total winter rainfall in the region has decreased by about 14%, which leads to drier summer conditions.
- The intense dry heat that primed plants to burn ahead of the fires was about 18% more intense because of climate change.
- A combination of hot, dry and windy conditions that drove the spread of fires was about 22% more intense due to climate change.
- Simultaneous wildfires across Europe are stretching firefighting resources and more intense events are already outpacing efforts to adapt.

Theodore Keeping, Researcher at the Centre for Environmental Policy Imperial College London, said:
"Yet again, unrelenting heat has caused tinder-dry conditions in Europe. Our study finds an extremely strong climate change signal towards hotter and drier conditions.

"These results are concerning. Today, with 1.3°C of warming, we are seeing new extremes in wildfire behaviour that has pushed firefighters to their limit. But we are heading for up to 3°C this century unless countries more rapidly transition away from fossil fuels."

Hundreds of wildfires broke out in the eastern Mediterranean in June and July. The blazes were driven by back-to-back days above 40°C, bone-dry vegetation and winds that reached gale-force levels. Türkiye was the hardest hit, with 17 people killed. Among them were ten firefighters, who died when the winds suddenly changed direction and flames trapped them. Two people were killed in Cyprus and one in Greece. More than 80,000 people have been forced to evacuate across the countries.

The study examined weather conditions in the months and days leading up to the worst blazes this year and during them. Observations of winter rainfall were first analysed, which plays a key role in determining

how flammable the landscape becomes in summer. It has dropped by about 14% since the preindustrial era, before humans began burning fossil fuels, the study found.

They then analysed how intense, dry heat primed plants to burn just before the outbreaks of fires. To do this, the scientists analysed a metric that reflects how 'thirsty' the air is. They found that a week of the highly-evaporative conditions is now about 13 times more likely and 18% more intense because of climate change.

Next, the scientists analysed the combined hot, dry and windy conditions over three days that fuelled the chaotic spread of fires. Without climate change, similar events would only occur about once every 100 years. But today, with 1.3°C of warming, they are expected about once every 20 years. Overall, the fire-prone conditions were made about 10 times more likely and 22% more intense by climate change.

Lastly, the weather patterns that brought the extreme northerly winds, known as the Etesian winds, were analysed. The analysis found an increase in the intensity of the high-pressure systems like the one that drove the devastating fires. This result indicates a strengthening of fire-fanning Etesian winds, which agrees with published studies from the region.

Türkiye, Greece and Cyprus face an increasing risk of more intense and harder-to-control wildfires unless the world speeds up the transition from fossil fuel to renewable energy. If warming reaches 2.6°C, which is expected this century under current policies, similar periods of intense hot, dry and windy conditions will become another 9 times more likely and 25% more intense.

The study highlights a need for future-looking strategies that decrease the risk of wildfires starting and spreading. The current approach across the three countries emphasises suppression, with large firefighting forces and fleets of water-bombing planes and helicopters. This year, nearly 650 firefighters from 14 countries were pre-deployed in high-risk areas in anticipation of severe fires. Such international deployments will continue to be needed, but greater focus needs to be placed on preventing fires, such as strengthening fuel management strategies and improving community fire risk awareness and prevention, the researchers say.

Hundreds of wildfires occurring at the same time across Europe highlights how firefighting resources are already strained today, at 1.3°C of warming, the researchers say. As of August 21, the EU Civil Protection Mechanism – which coordinates support during emergencies – had been activated 17 times for wildfires this year, including by Greece, Spain, Bulgaria, Montenegro and Albania over one week. As the climate warms, more countries across Europe will need to tackle wildfires that continue to stretch resources, and researchers warn that there is a risk that extreme fires could overwhelm efforts to adapt in some places.

The study is the first rapid attribution analysis on a wildfire in Europe and was conducted by 28 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.

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

"The wildfires sweeping across Europe show just how difficult they are to contain.

"Even with hundreds of pre-deployed firefighters, reinforcements from neighbouring countries, and water-dropping planes, the blazes have been devastating

"The hard work to implement long-term wildfire management strategies that proactively manage fuel availability and empower communities to prepare for wildfires must continue to help keep people safe."

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

“Human civilisations have flourished in the Mediterranean for millennia. But in just 250 years of fossil fuel burning, a 1.3°C hotter climate has given rise to extreme fires that could become existential.

“The devastating fires in Türkiye, Greece and Cyprus need to be taken as a warning – as long as countries burn oil, gas, and coal, global temperatures will rise and the risk of massive, fast-spreading fires will continue to increase.

“We have all the tools and knowledge needed to transition to renewable energy. But there are vested interests keeping the world hooked on fossil fuels. We need our political leaders to step up and secure a healthier, safer future.”

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

“The key drivers of fire-prone conditions are changing in the worst way possible in the eastern Mediterranean – extremely hot conditions on windy days are increasing and seasonal rainfall has decreased.

“Together, these changes result in a drier, more flammable landscape with wildfires that are much harder to contain.

“The fire season still has weeks to go in Europe, but it is already the continent’s worst ever recorded with more than a million hectares burned. We have started a rapid analysis on the wildfires in Spain and are expecting to find another strong climate change signal.”

Dr Bikem Ekberzade, Researcher at the Eurasia Institute of Earth Sciences, Istanbul Technical University, Türkiye, said:

“In Türkiye, wildfires peaked unexpectedly in June this year, whereas the peak fire season in the region usually falls within the four weeks from mid-July to mid-August.

“Human ignitions were the primary cause, while meteorological conditions – especially high surface wind speeds – contributed to the rapid spread and severity of the fires.

“When vegetation is dry and winds are high, a single ignition, regardless of its source, can rapidly turn into a hard-to-control wildfire. And in a warming world, with more overlap between urban and wildland areas, larger, more severe and fatal fires could soon become the norm."

Dr Gavriil Xanthopoulos, Researcher Director at the Institute of Mediterranean Forest Ecosystems of the Hellenic Agricultural Organization, Greece, said:

“The northeasterly Etesian wind blows across the Aegean Sea and increases the danger of wildfires in Greece. It is getting stronger and affecting wider regions of the country.

“Back in the 80s and 90s, Etesian wind events would blow for four to five days at around force seven speeds. The wind would typically die down on the second, third and fourth night of an Etesian event. Firefighters would wait for that as it would give them an opportunity to control the fire by early morning. It seems that they cannot count on this pattern anymore.

“In the past getting wind speeds of force eight or even nine were very rare. Today, these velocities are reached more often.

“These personal observations are aligned with the results of our analysis on weather patterns associated with Etesian winds. Further study using long-term meteorological data is needed to understand how the Etesian is changing and to prepare for the future.”

Prof Apostolos Voulgarakis, AXA Chair in Wildfires and Climate at the Technical University of Crete and Associate Director of the Leverhulme Centre for Wildfires, Environment and Society, Imperial College London, said:

“Here in Greece, we’ve endured nearly three consecutive years of above-normal monthly temperatures. This makes extreme wildfire events almost inevitable.

“Indeed, the summers of 2023, 2024, and 2025 have all featured catastrophic and in some cases unprecedented wildfire events. In Crete, where our team is based, we’ve seen large fires, especially this year, but thankfully not to the extent of being widespread catastrophes or claiming human lives.

“However, statistically there is an increase in the probability of a catastrophic wildfire event as climatic conditions become more conducive to wildfires.”

Dr. Kostas Lagouvardos, Research Director at the National Observatory of Athens said:

“Analysis of the wind speed patterns during the last 30 years showed an increasing trend over the Aegean during summer.

“This increase contributed to the deterioration of the pyrometeorological conditions over the area. In addition, more prolonged heat waves (e.g. during the 4 out of the 5 last summers, long-lasting heatwaves occurred in Greece, a frequency never seen so far) result in extreme dry conditions of the dead fuel in the Greek forests.”

Anastasia Kokkini, Hellenic Red Cross volunteer, said:
“It has been a challenging summer for us in Greece.

“All across the country, Hellenic Red Cross volunteers have mobilized to support the communities ravaged by wildfires. We have been assisting firefighters, providing first aid and helping evacuating people.

“Many have got burns and respiratory problems, households have been completely destroyed. Our support efforts continue as the wildfire season is far from over.”

Notes

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 quantify the effect of climate change on the wildfires in Türkiye, Greece and Cyprus, the scientists analysed weather data and climate models 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 region of the eastern Mediterranean, focused on this year’s fires up until late July and analysed trends in the most intense fire-weather in each year.

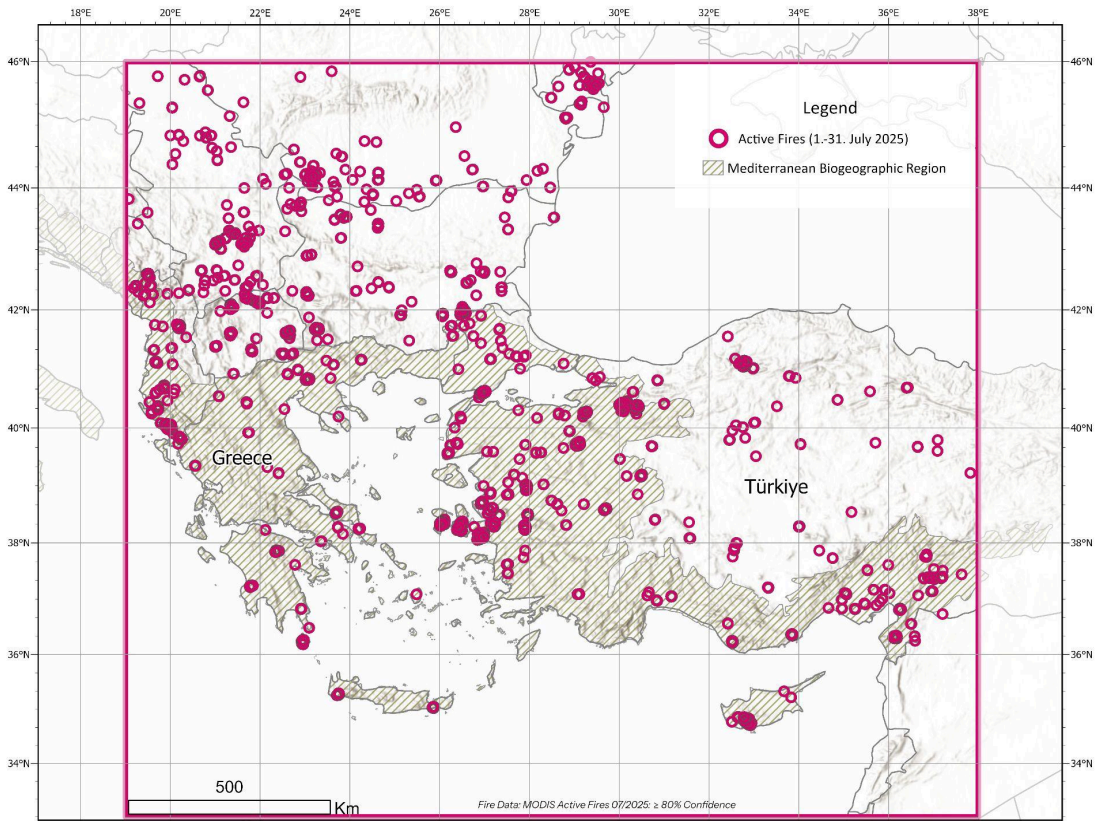
The scientists analysed trends in the total winter rainfall from October to April across the region. This did not include climate models meaning it is not considered to be a full attribution analysis.

They then analysed Vapor Pressure Deficit (VPD) using observations and climate models, which refers to the difference between the amount of moisture the air can hold and the amount it actually holds. It reflects how hot and dry air evaporates moisture from evaporation.

Next, using observations and climate models, the scientists analysed 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.

Lastly, using weather observations, they analysed how high pressure systems, similar to the ones that brought strong winds and high temperatures to the region, have changed over time. This analysis of weather analogues looked at two time periods: 1951–1980 and 1994-2023.

Study region



Study webpage

The study “Weather conditions leading to deadly wildfires in Türkiye, Cyprus and Greece made 10 times more likely due to climate change” will be published on Thursday 28 August, 3am British Summer Time / 5am Eastern European Summer Time. When the embargo lifts, the study will be available at:

https://www.worldweatherattribution.org/weather-conditions-leading-to-deadly-wildfires-in-turkiye-cyprus-and-greece-made-10-times-more-likely-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 100 studies on a range of extreme weather events around the world using peer-reviewed methods. To date, 26 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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