

MEDIA BRIEF

Wildfires and climate change: Data, resources, and in-depth analyses

Wildfires in Spain and France have already forced more than 300,000 people to leave their homes and holiday areas in late July 2026, highlighting how extreme heat, drought and land-use pressures are converging into **a new wildfire reality**. In 2025, 1,034,000 hectares of forest burned in Europe – an area larger than Cyprus – and global wildfire events may **increase by around 50% by the end of the century** if current climate and land-use trends continue.

The following is a selection of CMCC insights, resources, and experts on the most advanced scientific knowledge and solutions to wildfires, with a focus on prevention and preparedness, impacts on the carbon cycle and how advanced technologies such as AI can help build a society that is more resilient to growing wildfire risk.

Key messages:

- Climate change is expected to [dramatically expand wildfire danger worldwide](#) with consequences for livelihoods, ecosystems and long-term adaptation and land-management strategies.
- Drought, dry landscapes and growing towns are combining to drive [wildfire hotspots in Southern Europe](#), revealing the importance of prevention, preparedness and “anticipating risk”.
- New satellite-based frameworks help [map greenhouse gas emissions from forest fires](#) at national and regional scales, improving how countries monitor and report wildfire-related emissions for climate policy.
- [Smoke from forest fires travels](#) hundreds to thousands of kilometres across the Mediterranean, carrying PM2.5, black carbon and organic carbon and **affecting air quality and human health far from the fire front**.
- [Wildfire assessments](#) in countries such as Greece, Italy, Germany, Romania and Moldova reveal governance gaps, risk-management capabilities and the need for a **shift from suppression-focused models to integrated, prevention-oriented approaches**.
- Integrating supercomputing, artificial intelligence, IoT sensors, drones and satellite data into [decision-support systems and digital twins for drought and wildfire prevention](#)
- Innovative **climate insurance solutions** that [integrate adaptation efforts](#) and nature-based [solutions](#) are a key solution to both protect assets and improve wildfire prevention and preparedness.

Causes and solutions

When it comes to understanding what is causing wildfires, research [indicates](#) not only that both the **frequency and scale of megafires** has significantly increased in recent years, but also that the **proportion of wildfires occurring during heatwaves (HWs) rises sharply for larger fire-size thresholds**. In the years between **2008 and 2023** across **Greece, Portugal, Spain, France, and Italy** **heatwave intensity**, more so than duration, was the strongest driver behind the occurrence of megafires.

CMCC research shows that **climate change and mismanaged landscapes are expanding wildfire danger worldwide**, with fire risk intensifying not only in traditional hotspots but also in regions that historically experienced fewer fires. In the Mediterranean region – where over 80% of European wildfires occur – losses reached approximately **2.5 billion euros in 2022 alone**, and 2023 was among the worst wildfire years recorded in the European Union, with **over 500,000 hectares burned**. [Recent CMCC](#) work on Southern Europe also highlights how drought, increasingly flammable vegetation and expanding towns at the wildland-urban interface are combining to create true wildfire “hotspots” in parts of Italy, Spain, Turkey and other regions.

How we respond to wildfires is therefore an essential part of scientific enquiry. Research indicates that a move towards [prevention and preparedness](#), as opposed to the overwhelming time and resources currently spent on direct responses, is the most effective approach. This involves applying integrated approaches that encourage local communities to be both more involved in risk reduction and adaptation efforts and more resilient to the impacts of wildfires as well as concentrating on [wildfire risk governance](#).

Expert quotes:

“Despite recent advancements in wildfire risk management by EU countries, substantial efforts are still required to reinforce wildfire risk governance frameworks in order to effectively respond to the escalating challenges posed by climate change, environmental degradation, and socio-economic transformation,” says [Veronica Casartelli](#). “We urgently **need a shift from a suppression-focused model to an integrated, prevention-oriented approach to wildfire risk management**, grounded in strategic planning, cross-sectoral collaboration, and long-term investment in risk reduction.”

“The current system of fire management, which is essentially based on fire extinction and emergency response, was – and still is – effective in mild weather conditions with low and medium intensity fires,” explains CMCC researcher [Valentina Bacciu](#). “In extreme conditions that favour the spread of wildfires this system does not hold up..”

“Close collaboration among academia, regional bodies and stakeholders committed to wildfire prevention effectively contributes to achieving useful results in terms of prevention and environmental protection,” says CMCC researcher [Maria Mirto](#). “The use of supercomputing infrastructures and cutting-edge technologies allow us to create **smart solutions to the critical issue of wildfires that affect large areas of forest in Puglia and Epirus regions every year.**”

“By harnessing knowledge from historical climate and environmental data to train deep neural networks, a **digital twin can provide scientists with novel analysis solutions for extreme events like wildfires.** The trained models can be used, jointly with climate projection data, as a base for understanding how climate can affect extreme event frequency and locations,” says CMCC researcher [Donatello Elia](#).

CMCC experts are available to share their insights with interested parties, including journalists.

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