AXA Climate

Altitude

UNDERSTANDING PHYSICAL CLIMATE RISKS



Episode #3

Wildfires: Where's the Phoenix in the Ashes?

KEY FIGURES AND INSIGHTS

More than **650,000 hectares** burned this year **in Europe**

€13 to 21bn is the average annual cost of wildfires for Southern Europe

French wildfires have released up to **2 $MtCO_2$** in the atmosphere this summer

The burned area in Europe could grow by **39%** by the end of the century

Florian Gallo
PhD Climate Scientist

Introduction

August 16th, 2026, 2:15 PM, somewhere in northeastern France.

Temperatures are finally starting to drop after the summer's fifth (!) heatwave. A few raindrops have appeared, sparse, yet visible on the living room window. A window that ought to be cooling the room, given that outdoor temperatures have finally become bearable. Yet, a window that we cannot open, lest we let in a grey, dusty, smoky air.

August 16th, 2026, 2:15 PM, and southern Belgium is burning.

After Fontainebleau and the Landes, it is the turn of the Hautes Fagnes to fall victim to a summer so hot and dry that forest fires have become a recurring guest of the evening news.

3,000 hectares.

Perhaps the worst forest fire ever recorded in Belgium. Yet, one is almost tempted to say, only 3,000 hectares, when compared to the **47,000 hectares that burned earlier in the Landes forest**. Or the **650,000 hectares that have gone up in smoke across the European Union** since the start of the year, with France, Spain, and Portugal being particularly hard-hit. This is more than **twice higher than the 20-year average**, but still lower than the **1Mha burnt in the first eight months of 2025**, the worst year on record in Europe. But the season is not done yet. Now fully in September, temperature anomalies remain high, with **40°C recorded in Southwestern France**, and the conditions are still prone to wildfire triggering and propagation in most of the Mediterranean area.

Despite the lingering heat, local and national authorities are already starting to assess the impacts of the strong wildfire season. In France alone, the direct costs of the summer wildfires alone could reach at least **€500mn**, including **physical damages on assets, rehousing of displaced populations or short-term coverage of business interruptions**. However, the total damages on the French economy, including lower productivity, impacts on tourism and medium - to long term damages on crop et forests could reach up to **€10 to 15bn**, according to a preliminary report from Morningstar DBRS[1]. In 2025, the costs from the **Los Angeles wildfires had been estimated to at least USD 62bn** (some assessments going as high as USD 250bn). And these numbers are not exceptional, as a recent study[2] estimates the average annual cost of wildfires to range from **€13 to 21bn for Southern Europe**.



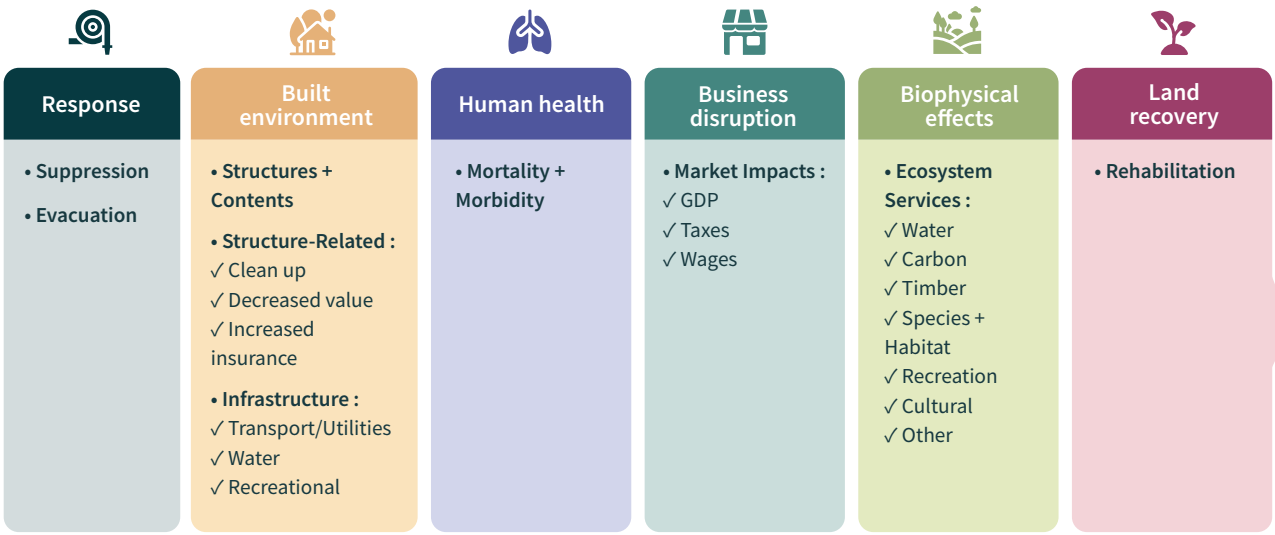
Maximilien Lamy / AFP: Moutchic beach, Lacanau, July 2026

A range of potential impacts

Beyond the loss of properties, wildfires bring a range of physical, operational, sanitary impacts, including but not limited to:

- **Firefighting costs:** local and national authorities spend a significant amount of money preventing fires preparing for them, as well as fighting fires when they are actively burning. In the US, annual fire suppression costs have been estimated to almost USD3bn[3];
- **Relocation of displaced populations:** during the 2026 summer, more than 200 000 people had to be temporarily relocated in France[4];
- **Direct and indirect impacts on tourism:** visitors have to cancel rental plans in the short term and regions that are often impacted can lose attractivity in the medium term. Analysis of campgrounds frequentation in the Western US has shown a 6.4% drop in visitors when the site is located within 20km of a fire[5], while the impacts on tourism of the wildfires in Gironde are expected to linger for 2 to 5 years[6].
- **Direct and indirect impacts on the economy:** beyond the direct costs of visitors' cancellation on revenues, the loss of activity also negatively impact GDP and taxes at local and national level, as well and cause a rise in unemployment, as seen with other climate hazards[7];
- **Health impacts:** wildfires cause direct fatalities and illnesses from the fire itself, but the major impacts usually arise from smoke inhalation and mental wellbeing. During the 2025 Los Angeles fires, the total death toll was estimated to 440 casualties[8], a tenfold increase compared to the initial assessment carried out after the event.
- **Atmospheric and water pollution, including carbon emissions:** wildfires are turning forests from carbon sinks to carbon sources. In France alone, more than 1.5 million metric tons of CO_2 were released in the atmosphere from fires during the 2026 summer. Overall, 4 to 7 billion tons of CO_2 are released every year from wildfires[9], accounting for around 20% of all CO_2 emissions.

Figure 1 *- Economic costs of wildfire*



The figure depicts the chronological order of costs (left to right) as well as the typical order of prevalence in documentation. Subsequent post-wildfire flooding can cause similar types of damages.

Wildfires and health

It is not difficult to imagine the health impacts of wildfires on directly exposed populations: burns, injuries or casualties due to fire exposure or falling infrastructures… However, the major health-related impacts of exposure to fires are usually longer-lasting, adding to the pressure on hospital and the health system in general for weeks, months, years on.

Wildfire smoke strongly impacts air pollution, through the emission of toxic gaseous components and particles. In the very short term, exposure to very small particles (90% of wildfire-related particles are smaller than 2.5 micrometres[10]) can affect respiratory and cardiovascular functions, especially on pre-disposed people[11] (e.g. asthma patients, elderly populations).

Longer term effects on respiratory and cardiovascular diseases, nervous systems and mental health issues or cancer occurrences[12]. If the extent of the effects is still discussed, negative impacts have been identified by several studies on birth outcomes and maternity, including birth weight [13,14].

Smoke from the wildland-urban interface (WUI) could bring even further damages, as their composition differ from vegetation fires, as they include toxic components from human activities located in the WUI (e.g. plastics, synthetic textiles, chemicals)[15].

Assessing exposure to wildfire smoke requires direct measurements but also large-scale monitoring, including satellite imagery (e.g. MODIS, VIIRS), to define the extent of the impacted area. Wildfire smoke can indeed travel thousands of kilometres and impact populations that are far beyond the reach of the fire itself. It is therefore crucial to be able to assess the extent of wildfire-related air pollution to minimise health impacts on populations within a broader radius.



Climate change and wildfires



Let's get back on the ground.

Wildfire occurrence is driven by a range of factors, including :

- **land cover and vegetation**
- **fire management**
- **population density and people behaviour (9 fires out of 10 are the result of human actions)**
- **land-use changes, and, of course**
- **weather conditions**

Warm, dry and windy days are the perfect context for the triggering and the spreading of wildfires. Climate change is therefore a major driver of the evolution of the wildfires spatiotemporal patterns around the world, but the picture is far from homogeneous.

Looking at recent trends brings surprising results. The burned area has been declining over the past decades[16], while CO_2 emissions associated with wildfire are on the rise. This is likely due to agriculture intensification and landscape fragmenting, especially in African savannahs, leading to a decrease in the available vegetation for fire propagation. However, wildfire activity has increased in many fire-prone regions (e.g., the Mediterranean area) and has spread to places that were less impacted historically (e.g., the UK, Canada, or Siberia[17,18]).

In Canada, the number of fires has been declining for the past 30 years, but the burned area is on the rise, with more than 35Mha that have gone up in smoke in the past 4 years[19]. To be clear, this is an area larger than Italy that has disappeared in the Canadian forests. In 4 years.

Despite progresses in fire management, the warmer climate and the increasingly frequent and intense droughts due to climate change are enhancing the fire risks in most regions. Recent events, such as the 2026 European wildfires, have been clearly linked with climate change: **the weather conditions preceding the fires in southwestern France are now 40% more likely than they would have been in 2000**[20].

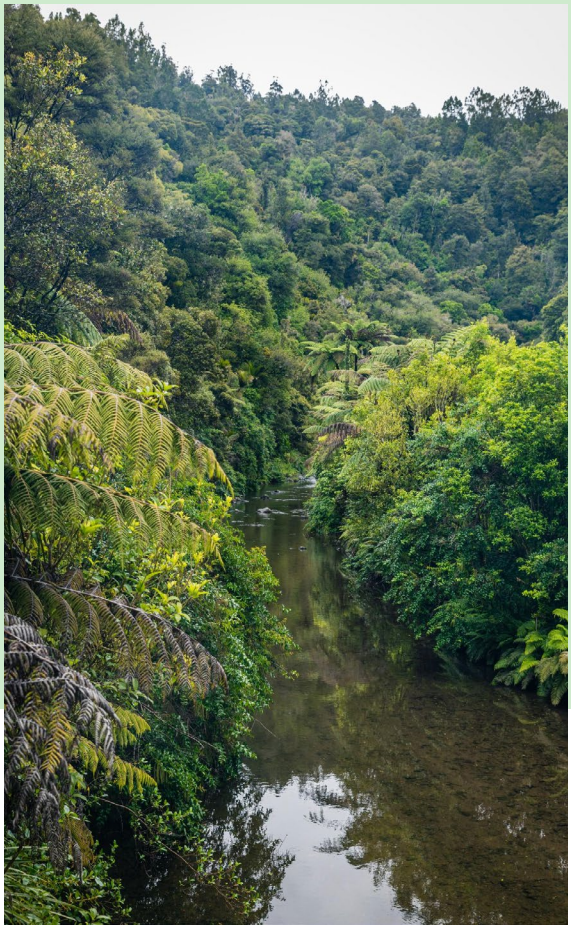
Wildfires and CO_2 emissions

Forests and vegetated areas are of vital importance to climate change mitigation, as they act as carbon sinks, trapping carbon into their structure while growing, removing up to 15GtCO_2e per year, for a net trapping of about half of it, when considering deforestation and loss of forests[21]. However, climate change threatens this sink effect, as more and more carbon from forests is being released in the atmosphere during wildfires.

Worryingly, historical large carbon sinks are turning into carbon sources: **the 2023 Canadian wildfires have released at least 1.3GtCO_2e[22], twice the total annual greenhouse gases emissions in the country**. Over the past three years, emissions from Canadian wildfires have surpassed the country's total carbon footprint. A decline in the sink capacity of boreal and tropical forests has been observed in the 21st century[23], highlighting the risks of losing the main natural climate change mitigating effect and adding to the list of potential climate feedback loops that threaten to accelerate climate change.

If forests remain a carbon sink at global scale, this is mainly due to the enduring effect of **the three major tropical forest basins in the Amazon, the Congo and in Southeast Asia**[24]. However, increasing deforestation and more frequent and intense wildfires are threatening the increasingly vital role of tropical forests as carbon sinks, in a world where boreal forests are less and less able to maintain their carbon sink capacity.

Recurring wildfires also have a broader environmental cost: loss of biodiversity and timber resources, water pollution, land recovery… If such impacts are difficult to quantify, one can at least try to put a price on the associated GHG emissions: **in France, the recent wildfires in the southwest have released an estimated 1 to 2MtCO_2e**[25]. Applying a 50€ price on the ton of CO_2e, this translates to a staggering €50 to 100mn in direct environmental cost, adding to the already assessed costs of the French wildfires. If this type of calculation is yet theoretical, the additional burden that wildfire-related GHG emissions are applying on mitigation strategies could well turn into a real-life financial impact if those mitigation strategies get more likely to fail.



What does the future hold?

These fire-prone weather conditions are identified using a combination of different weather variables (put simply, temperature, precipitation, humidity and wind), called the Fire Weather Index. By looking at the projected evolution of this indicator, one can try to understand how fire-prone conditions, hence how the risk of wildfire, will evolve in the coming decades.

The increase in wildfire risks is expected to continue in all climate scenarios. **In Europe, a recent study[26] estimated that even in the best-case scenario, the burned area in Europe could grow by 39% by the end of the century, while in a high-emissions scenario, the burned area could triple**. By the mid-century, most of France and Germany face significant wildfire risk, while high risks will also prevail in Eastern Europe (fig.2). This means at least 15 million additional people living in fire-prone areas in Europe by the end of the century[27].

If the evolution of drought risk varies around the world, fire-prone weather conditions are expected to increase in most fire-prone areas in the world[28], but hot summers and more frequent droughts are not the only problem. Climate change is affecting weather conditions all year long, leading to warmer (and potentially drier) springs and autumns. This means that the fire season is lengthening, creating again more opportunities for wildfires to occur throughout the year. In the southern US and Central America, the fire season is already a month longer than at the end the 20th century[29].

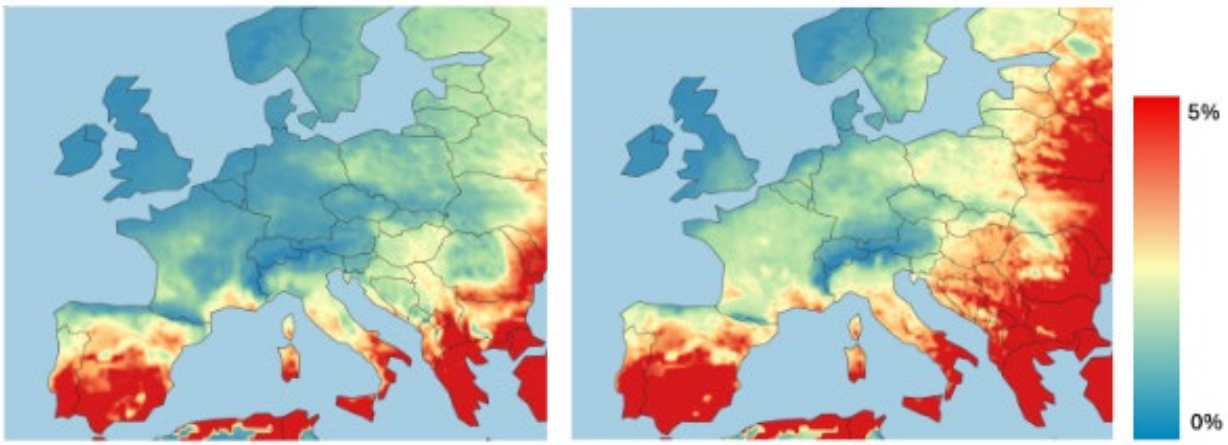


Figure 2 *- Evolution of the annual probability of wildfire from 2000 to 2050, following the SSP2-4.5 climate scenario[30]*

Conclusion

Are we all doomed then?

Are we then all doomed to watch our forests gone up in smoke and cancel any climate mitigation strategies? Among this ocean of bad news, there is still hope.

First of all, some types of fire are decreasing, due to changes in land management practices. The use of fire as a land management tool, to clear up pastures from shrubs or create space for cattle grazing has been decreasing, and with it the number and extent of savanna and grassland fires in Africa for example[31].

Then, the current occurrence of large wildfires in the US and Canada, for example, has been (perhaps counterintuitively) linked to a buildup of fuel, due to the success of fire suppression. Recent, large events are decreasing the amount of fuel available for large fires. Areas that have recently burnt are less susceptible to fires in the near future.

More importantly, fire awareness and protection are improving. Global and regional platforms[32,33,34] are providing near-real time data for monitoring weather conditions and current fires. Access to satellite data is expanding and early warning systems are being implemented to anticipate risks and accelerate the response to fires. Continuous improvements of fire management capacities could reduce the projected increase in burned area by 72 to 92%[35].

For livelihoods, assets and activities on the ground, adaptation to the increasing wildfire risk first require to better understand its own context. In the long term, knowledge is required on the evolution of the local climate during fire season, proximity to the wildland-urban interface (the transition zone where wildfire can spread to urbanised areas), historical events in the region. In the short term, closely monitoring wildfire and air pollution alerts during the fire-prone months, establishing and implementing operational fire management practices and preparing business continuity plans are among the available tools to minimise the adverse impacts of fires on the activity.



Disclaimer

This document is for informational purposes only and does not constitute investment research or financial analysis relating to transactions in financial instruments as per MIF Directive (2014/65/ EU), nor does it constitute on the part of AXA Climate an offer to buy or sell any investments, products or services, and should not be considered as solicitation or investment, legal or tax advice, a recommendation for an investment strategy or a personalised recommendation to buy or sell securities. Due to its simplification, this document is partial, and opinions, estimates, and forecasts herein are subjective and subject to change without notice. There is no guarantee that forecasts made will come to pass. Data, figures, declarations, analyses, predictions, and other information in this document are provided based on our state of knowledge at the time of creation of this document. While every care is taken, no representation or warranty (including liability towards third parties), express or implied, is made regarding the accuracy, reliability, or completeness of the information contained herein. Reliance upon information in this material is at the sole discretion of the recipient. This material does not contain sufficient information to support an investment decision. Issued in France by AXA Climate, registered with the Trade and Companies Registry of Paris under the number B 493 363 378, registered as an insurance intermediary at the French single register of insurance, banking, and finance intermediaries under the number 07029015 (www.orias.fr) and whose registered office is at 14-16 Boulevard Poissonnière, 75009, Paris – France.

Author

Florian Gallo

PhD Climate Scientist

Florian is the lead climate scientist for Altitude, ensuring scientific robustness on the platform and building knowledge among users. After a PhD in geosciences, working on landslides dynamics in mountain ranges, he spent the past 15 years trying to bridge the gap between climate science and real-world users, especially in the public and financial sectors. His focus is on the development and the dissemination of usable, understandable, and useful climate information for all.

Visit our website

www.AXA-altitude.com

And our LinkedIn page

AXA Altitude

Contact us if you have any inquiry at

altitude@axaclimate.com

Sources

[1] https://www.publicsenat.fr/actualites/environnement/une-facture-qui-sannonce-colossale-apres-les-incendies-les-canicules-et-la-secheresse-de-lete-2026

[2] Meier, S., Elliott, R. J., & Strobl, E. (2023). The regional economic impact of wildfires: Evidence from Southern Europe. Journal of Environmental Economics and Management, 118, 102787

[3] https://www.clarity.io/blog/the-invisible-costs-of-wildfires-what-is-the-true-financial-impact

[4] https://www.liberation.fr/environnement/climat/incendies-les-frais-de-relogement-des-220-000-evacues-seront-pris-en-charge-par-les-assurances-assure-le-gouvernement-20260727_KHWDSEGN3JESPAPXDN27VQQ2XE/

[5] Gellman, J., Walls, M., & Wibbenmeyer, M. (2022). Wildfire, smoke, and outdoor recreation in the western United States. Forest Policy and Economics, 134, 102619.

[6] https://www.inrae.fr/actualites/comprendre-incendies-forets-2026-causes-impacts-resilience

[7] Deryugina, T., Kawano, L., & Levitt, S. (2018). The economic impact of Hurricane Katrina on its victims: Evidence from individual tax returns. American Economic Journal: Applied Economics, 10(2), 202-233.

[8] Paglino E, Raquib RV, Stokes AC. Excess Deaths Attributable to the Los Angeles Wildfires From January 5 to February 1, 2025. JAMA. 2025;334(11):1018–1019. doi:10.1001/jama.2025.10556

[9] https://ourworldindata.org/grapher/annual-carbon-dioxide-emissions

[10] https://www.who.int/news-room/fact-sheets/detail/wildfires-and-health

[11] Lei, Y., Lei, T. H., Lu, C., Zhang, X., & Wang, F. (2024). Wildfire smoke: health effects, mechanisms, and mitigation. Environmental Science & Technology, 58(48), 21097-21119.

[12] Nan, N., Yan, Z., Zhang, Y., Chen, R., Qin, G., & Sang, N. (2023). Overview of PM2. 5 and health outcomes: focusing on components, sources, and pollutant mixture co-exposure. Chemosphere, 323, 138181.

[13] Yu, Y., Zou, W., Jerrett, M., & Meng, Y. Y. (2023). Acute health impact of wildfire-related and conventional PM2. 5 in the United States: a narrative review. Environmental Advances, 12, 100179.

[14] Holstius, D. M., Reid, C. E., Jesdale, B. M., & Morello-Frosch, R. (2012). Birth weight following pregnancy during the 2003 Southern California wildfires. Environmental health perspectives, 120(9), 1340.

[15] Lopes, M., Monteiro, A., Mouzourides, P., & Kouis, P. (2025). The health burden of wildfire smoke in a changing climate: Exposure, risks, and strategies for mitigation. Current Opinion in Environmental Science & Health, 46, 100631.

[16] Andela, N., Morton, D. C., Giglio, L., Chen, Y., van der Werf, G. R., Kasibhatla, P. S., ... & Randerson, J. T. (2017). A human-driven decline in global burned area. Science, 356(6345), 1356-1362.

[17] Jain, P., Barber, Q. E., Taylor, S. W., Whitman, E., Castellanos Acuna, D., Boulanger, Y., ... & Parisien, M. A. (2024). Drivers and impacts of the record-breaking 2023 wildfire season in Canada. Nature Communications, 15(1), 6764.

[18] Novenko, E. Y., Kupryanov, D. A., Mazei, N. G., Prokushkin, A. S., Phelps, L. N., Buri, A., & Davis, B. A. (2022). Evidence that modern fires may be unprecedented during the last 3400 years in permafrost zone of Central Siberia, Russia. Environmental Research Letters, 17(2), 025004.

[19] https://cwfis.cfs.nrcan.gc.ca/en/fire-history

[20] https://www.worldweatherattribution.org/climate-change-increases-likelihood-of-compounding-drivers-of-severe-wildfire-conditions-in-france-and-spain/

[21] Harris, N. L., Gibbs, D. A., Baccini, A., Birdsey, R. A., De Bruin, S., Farina, M., ... & Tyukavina, A. (2021). Global maps of twenty-first century forest carbon fluxes. Nature climate change, 11(3), 234-240.

Sources

[22] https://www.the-innovation.org/article/doi/10.59717/j.xinn-geo.2025.100176

[23] Pan, Y., Birdsey, R. A., Phillips, O. L., Houghton, R. A., Fang, J., Kauppi, P. E., ... & Murdiyarso, D. (2024). The enduring world forest carbon sink. Nature, 631(8021), 563-569.

[24] https://www.wri.org/insights/forests-absorb-twice-much-carbon-they-emit-each-year

[25] https://www.lemonde.fr/en/environment/article/2026/09/02/france-s-summer-2026-wildfires-lead-to-unprecedentedly-huge-carbon-emissions_6757067_114.html?srsltid=AU7gw4WlMUP4uUB2CUbhnmjoRyfd806ZhwsZV67aa1RGJtBuCAX5A-tW

[26] Billing, M., Forrest, M., Bowring, S. P., Oberhagemann, L., Neidermeier, A. N., Hetzer, J., ... & Thonicke, K. (2026). Future Projections of Burned Area in Europe Highlight the Importance of Human Action. Global Change Biology, 32(8), e71043.

[27] https://joint-research-centre.ec.europa.eu/system/files/2020-09/09_pesetaiv_wildfires_sc_august2020_en.pdf

[28] Gallo, C., Dieppois, B., Quilcaille, Y., Chiriacò, M. V., Fulé, P. Z., Drobyshev, I., ... & Eden, J. M. (2025). Future impacts of climate change on global fire weather: Insight from weighted CMIP6 multimodel ensembles. Journal of Climate, 38(22), 6445-6462.

[29] https://science.nasa.gov/earth/explore/wildfires-and-climate-change/

[30] Altitude wildfire model

[31] https://science.nasa.gov/earth/explore/wildfires-and-climate-change/

[32] https://gwis.jrc.ec.europa.eu

[33] https://forest-fire.emergency.copernicus.eu

[34] https://firms.modaps.eosdis.nasa.gov

[35] Billing, M., Forrest, M., Bowring, S. P., Oberhagemann, L., Neidermeier, A. N., Hetzer, J., ... & Thonicke, K. (2026). Future Projections of Burned Area in Europe Highlight the Importance of Human Action. Global Change Biology, 32(8), e71043.