THE STATE OF WILDFIRES PROJECT

State of Wildfires 2024-25

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An international partnership

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The State of Wildfires Report

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University of East Anglia | ECMWF | Met Office | UK Centre for Ecology & Hydrology

Global Assessment: Extremes and Impacts

Four extreme episodes

Assess the causes

Attribute to climate change

Predict future likelihood

Earth observations (Satellite images)

Regional expert panel

Meteorological reanalysis (Weather datasets)

Probabilistic fire models (Simulations using Observations)

Hadley Centre Climate Model

UK Land Model ‘JULES’

Dr Matthew Jones | UEA

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Global assessment of the 2024-25 fire season

Key findings from around the world

Canada experienced a second successive extreme fire season. Credit: Reuters

Extreme Fire Season for the Americas

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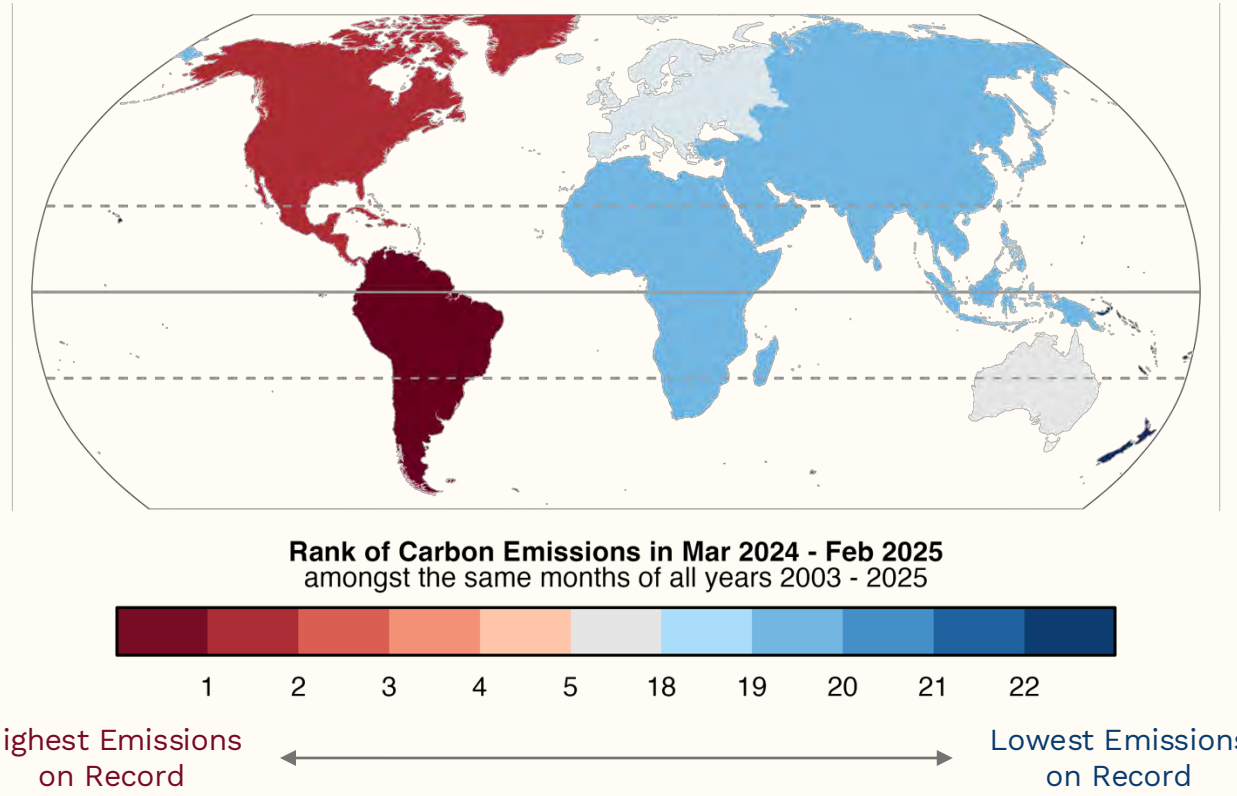

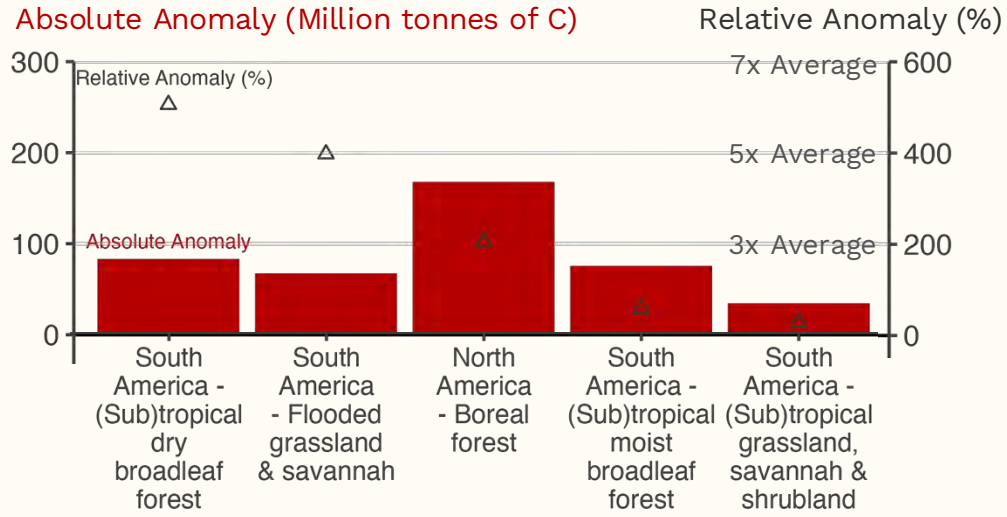

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9% above average

Globally, fires emitted over **8 billion tonnes of CO_2** in 2024-25**, 9% above average** and the 6th highest on recorded since 2003, mainly due to severe fires in South America and Canada.

The excess (above-average) emissions alone **exceeded the national fossil fuel CO_2 emissions of more than 200 individual countries**.

This fire season **continues a two-decade trend towards expanding fire in carbon-rich forests**, leading to high emissions even in years with less total area burned globally.

National and Sub-National Extremes

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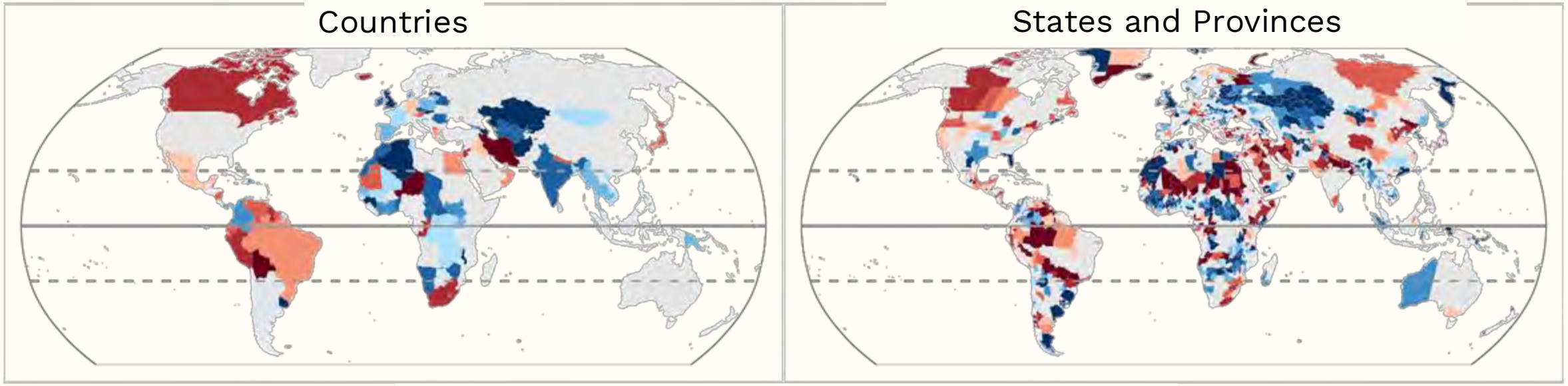

Ranking of the 2024-25 Fire Season

Highest Emissions on Record

Lowest Emissions on Record

National and Sub-National Extremes

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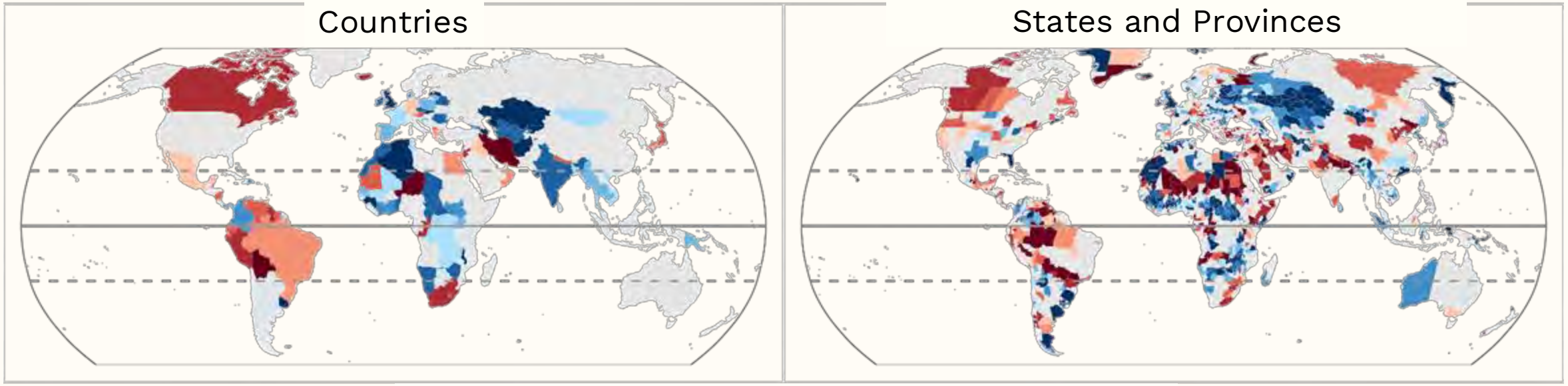

Ranking of the 2024-25 Fire Season

Highest Emissions on Record

Lowest Emissions on Record

Country	Above-average fire CO_2 emissions during 2024-25	Fire CO_2 emissions relative to Average	Ranking of the Fire Season
Canada	+700 million tonnes CO_2	+204%	2nd (only to 2023-24)
Bolivia	+500 million tonnes CO_2	+383%	1st
Brazil	+400 million tonnes CO_2	+55%	4th

Unpacking the 2024-25 Fire Season

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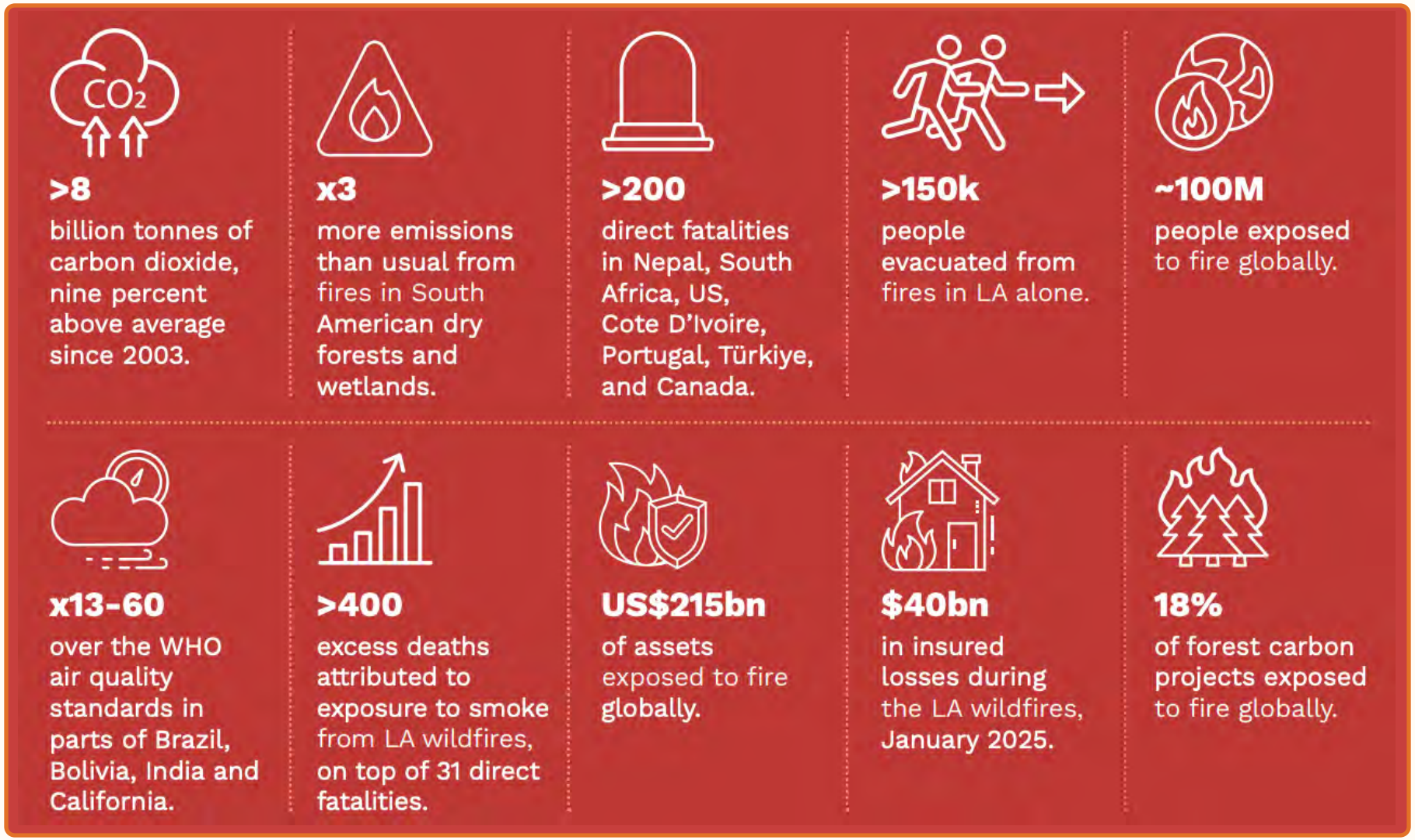

NORTH AMERICA

The 2024-25 fire season was the second most severe on record for North America

31,000 KM²
of burned area, **35% above average**.

194 TG C*
of carbon emissions, **112% above average**.
*700 million tonnes of CO_2

Focal event

Southern California, USA

The most disastrous wildfire event in modern US history occurred in Los Angeles County in January 2025 during a severe Santa Ana wind event.

Impact: The Palisades and Eaton Fires destroyed over 11,750 homes, killed at least 31 people, displaced over 150,000, and caused economic losses exceeding US$140 billion (including insured losses of US$20-75 billion). $PM_{2.5}$ levels peaked at 483 µg/m³, triggering a regional housing and insurance crisis.

Highlights

Western Canada

Northwest Territories, British Columbia, Alberta and Saskatchewan experienced their second-highest emissions year on record with a combined emissions anomaly of +191 Tg C and provincial anomalies in the range of +184-441%

Alberta, Canada

Extreme wildfires in summer 2024 destroyed 358 structures and led to $1.23 billion in damages, second only to the Fort McMurray fire of 2016. The town of Jasper was evacuated. Two firefighter fatalities occurred.

New York, USA

In an unusual late-season outbreak, every borough experienced multiple wildfires during a two-week span in October-November 2024, an unprecedented fire signal in a densely populated urban environment.

Mexico

Mexico experienced its worst wildfire season on record with over 8,000 wildfires and more than 16,500 km² burned. Particularly severe activity occurred in March-May, reportedly driven by drought and elevated temperatures.

"The January 2025 LA Fires became the most expensive wildfires ever recorded in just a few short days, and New Yorkers found out that their city can also burn when it is dry and hot enough. This should be a wake-up call for the US that climate change is making wildfires increasingly impossible to control and we need to broadly implement a multi-faceted set of mitigation strategies to avert future fire disasters."

Prof Crystal Kolden
Director of the UC Merced Fire Resilience Center, University of California Merced

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Dr Matthew Jones | UEA

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Extreme Episodes of 2024-25

Focussed analyses of key regions:

- Southern California
- Northeast Amazonia
- Pantanal-Chiquitano
- Congo Basin

Eaton Fire, Los Angeles 2025, Credit: Maxar Technologies

Focus Regions of the 2024-25 Report

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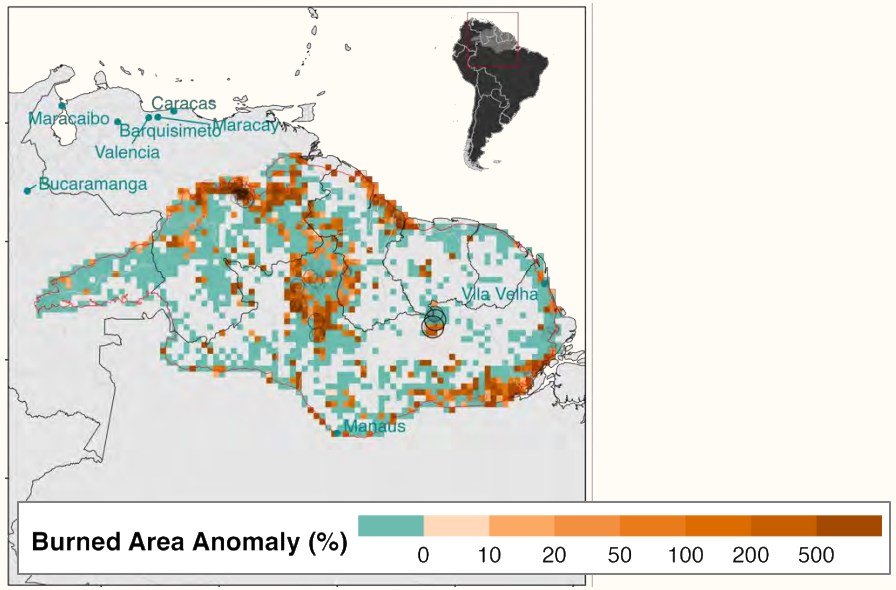
Northeast Amazonia

January-March 2024



- **Forest fire extent** more than 4x average and highest on record, surpassing the record set only one year prior (2023-24).
- **Highest forest loss** since 2016; 60% of loss caused by wildfire.
- **Humanitarian impacts of compound** air and water crisis: ~70,000 people already without water access then exposed to poor air quality.

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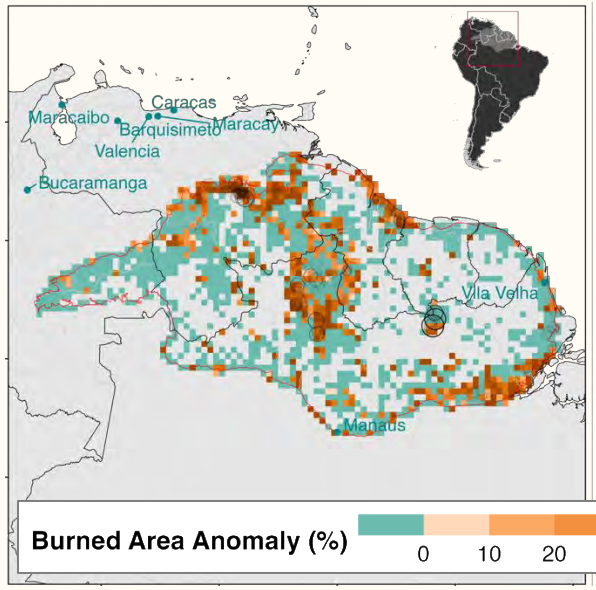

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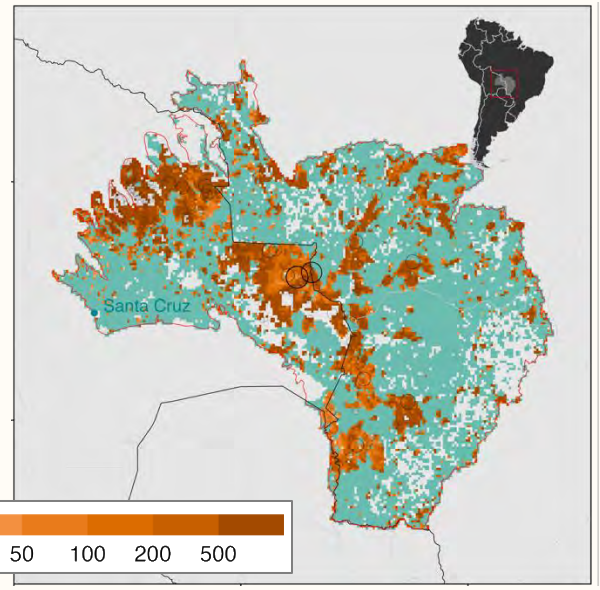
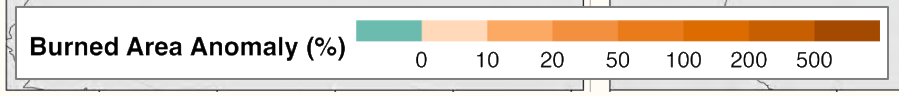
Pantanal-Chiquitano

August-September 2024





- **Fire extent twice the previous record**, triggering fire C emissions 6x average.
- **$PM_{2.5}$ concentrations** up to 60x WHO limit.
- **US$ 222M losses** for regional agribusinesses.
- **~80 days of firefighting** challenged by remote access and logistics.

Focus Regions of the 2024-25 Report

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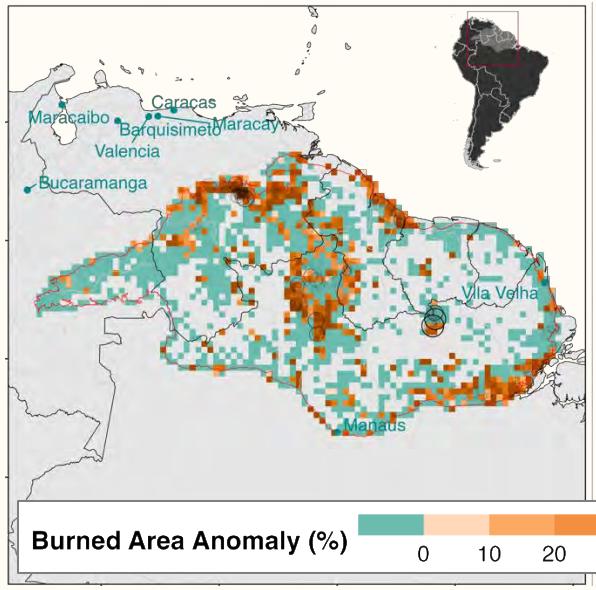
January-March 2024



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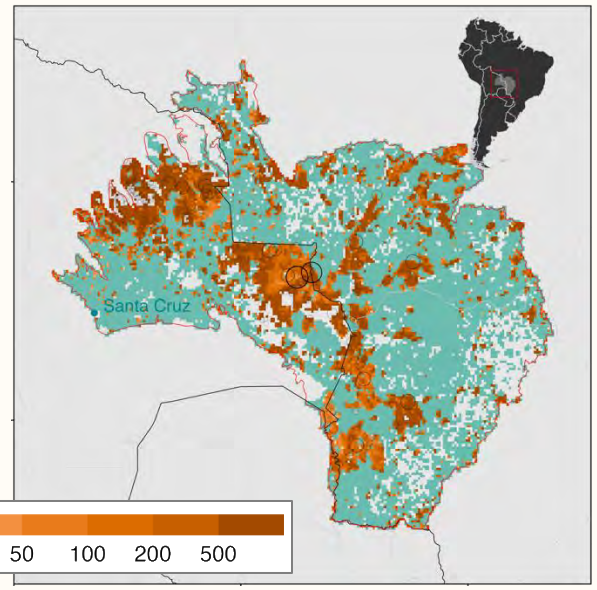

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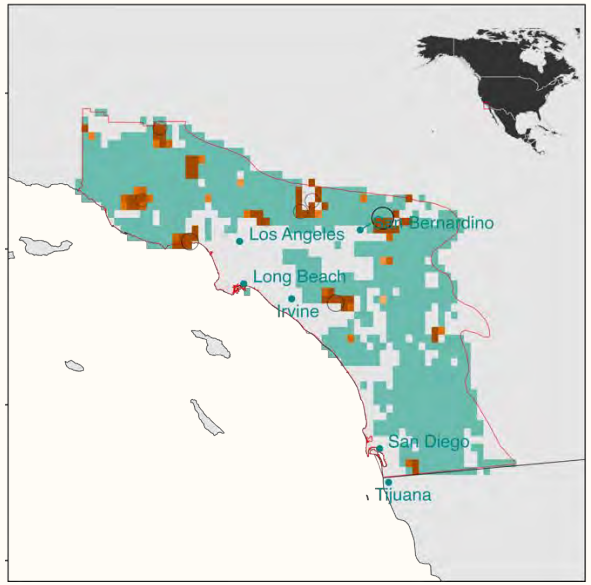
Southern California

January 2025



- **31 deaths. >11k homes** destroyed. **153,000 people** evacuated in LA.
- **$PM_{2.5}$ concentrations** up to 30x WHO limit with **400 excess deaths**.
- **US$ 140B** total in LA - costliest wildfires in modern US history.
- **US$ 4.6–8.9B** lost economic output with **~2,000 businesses** affected.
- **Homelessness crisis** worsened by loss of affordable housing units.

Focus Regions of the 2024-25 Report

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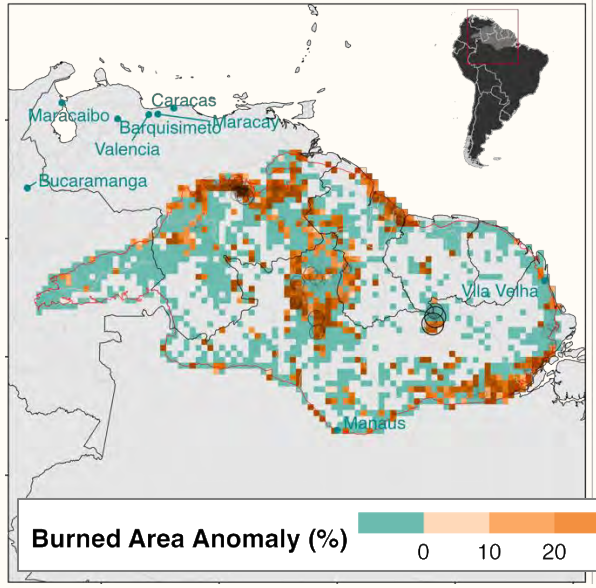
Northeast Amazonia

January-March 2024



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Pantanal-Chiquitano

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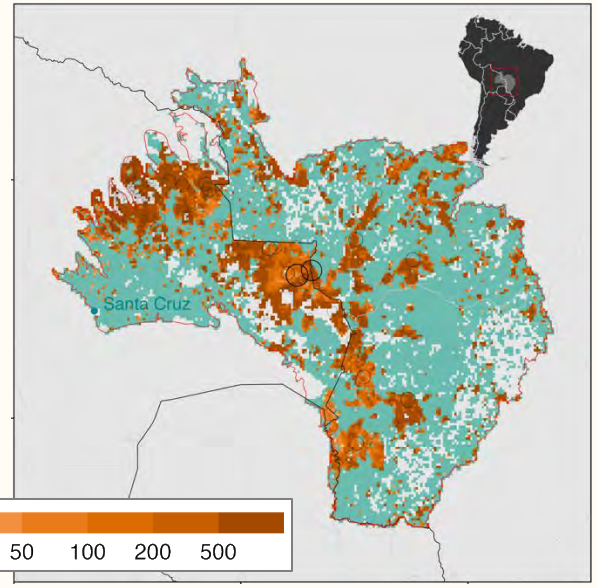

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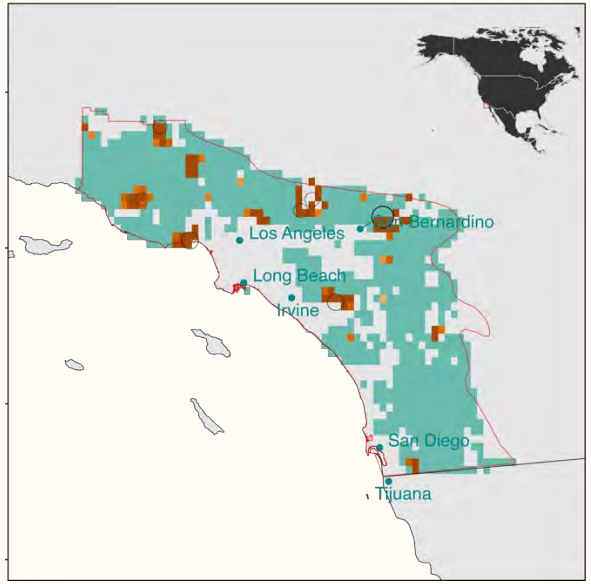

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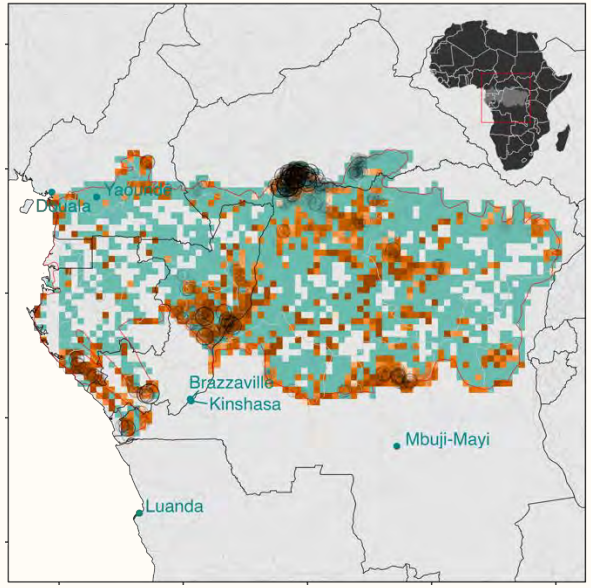
Congo Basin

July-August 2024



- **Burned area highest on record** and ~30% above average.
- **Highest forest loss** since 2015 in DRC and Republic of the Congo, **+150%** rise versus year prior, primarily driven by uptick in wildfire.
- **Highlights tendency for underreporting** of the effects of extreme fire events in Africa.

Dr Francesca Di Giuseppe | ECMWF

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Explaining Key Events of 2024-45

Focussed analyses of key regions:

- Southern California
- Northeast Amazonia
- Pantanal-Chiquitano
- Congo Basin

Fire in the Pantanal, the worlds largest wetland. Credit: Xinhua / Alamy

Explaining Extreme Fire Episodes

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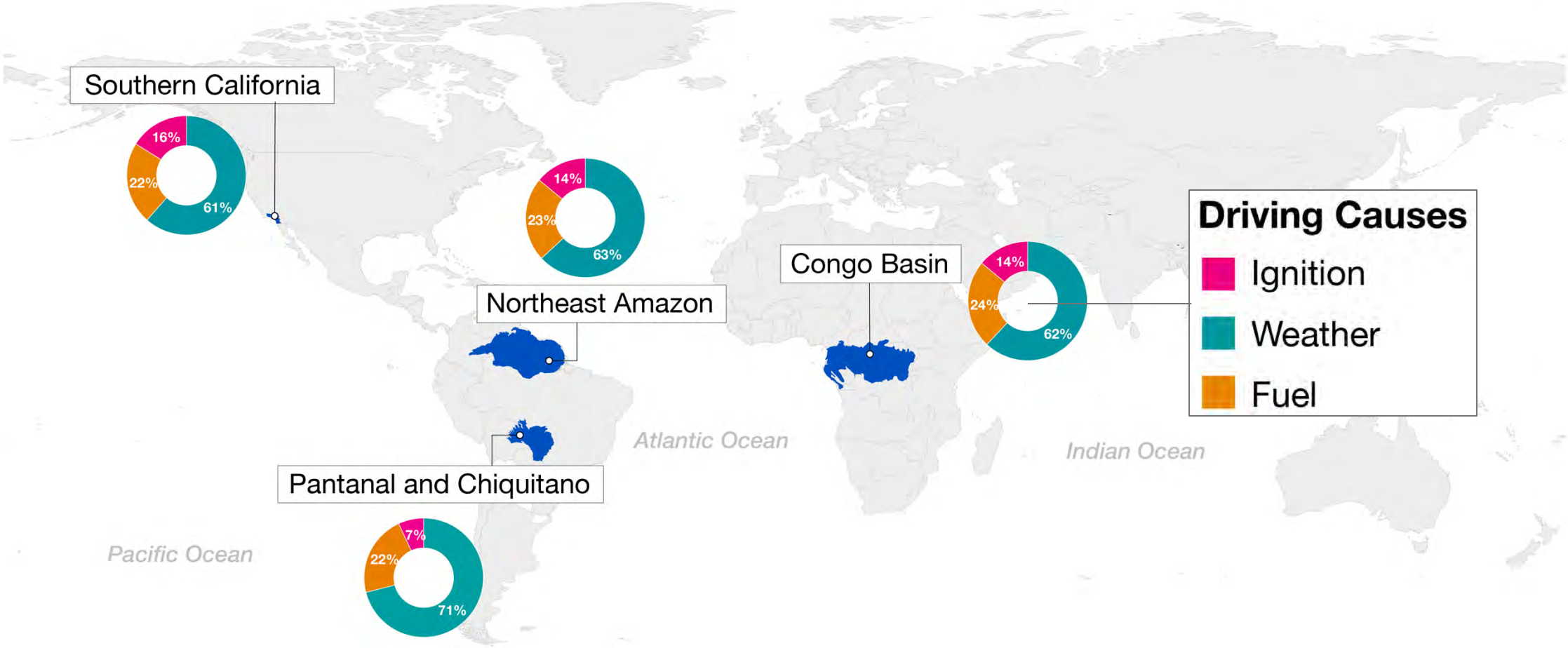

Explaining Extreme Fire in the Pantanal-Chiquitano

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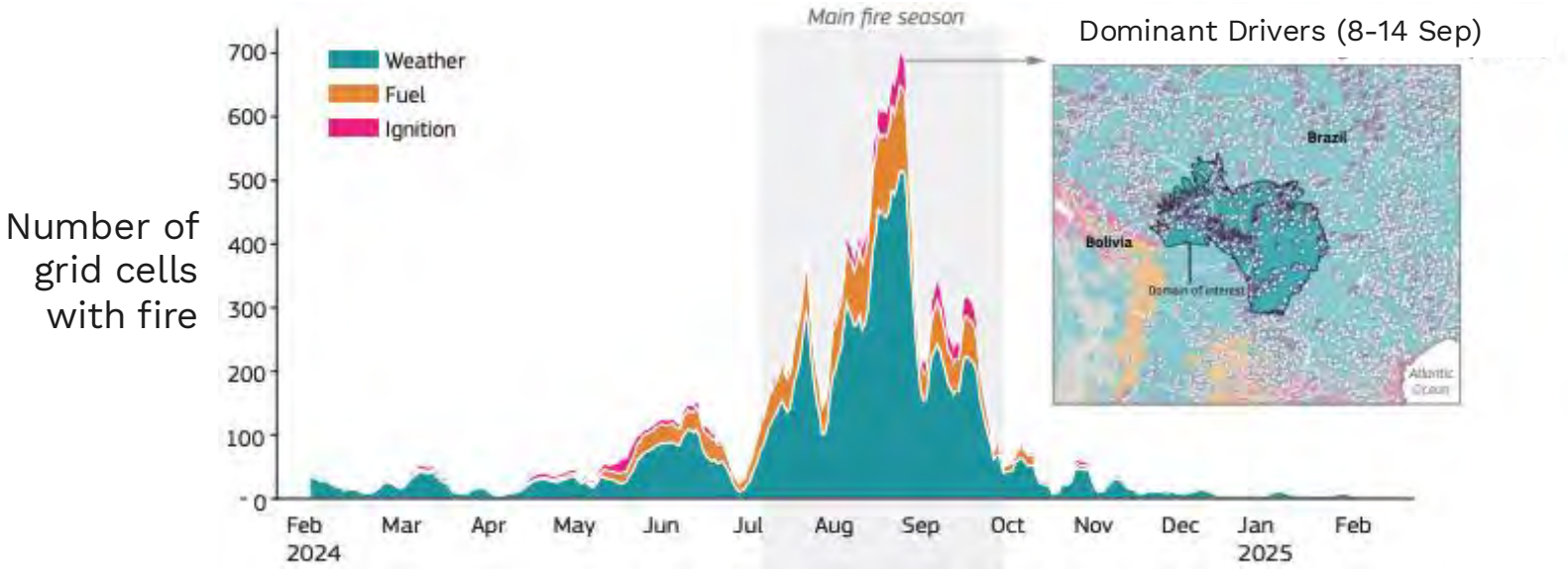


Four years of drought left wetlands, normally too wet to burn, fire-prone.

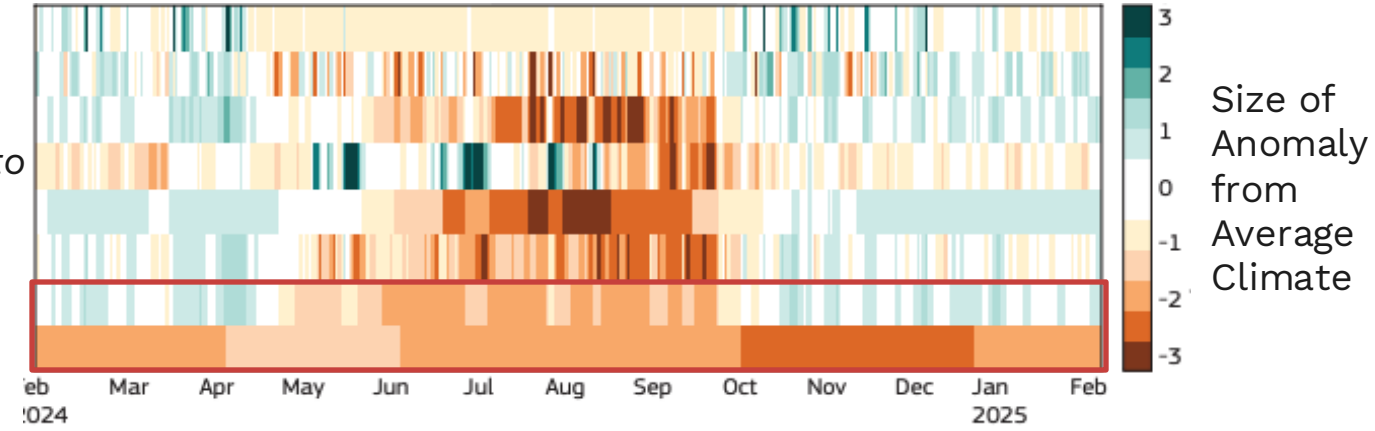
Precipitation

↓

Variables related to fuel

↓

Soil water depletion



Size of Anomaly from Average Climate

Explaining Extreme Fire in Southern California

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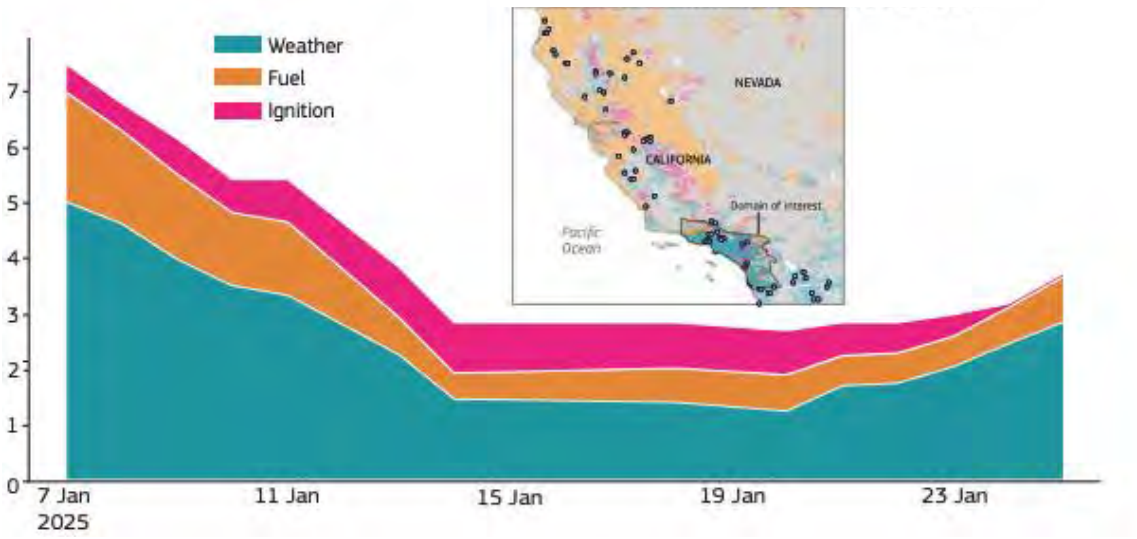
Dominant Drivers (5-11 Jan 2025)



Hydroclimatic rebound set the stage, with fuel accumulation from preceding wet seasons.

A rare concurrence of **rapid surface drying**, **hurricane-force winds**, and **ignitions at the wildland–urban interface** drove one of the **costliest natural disasters in U.S. history**.

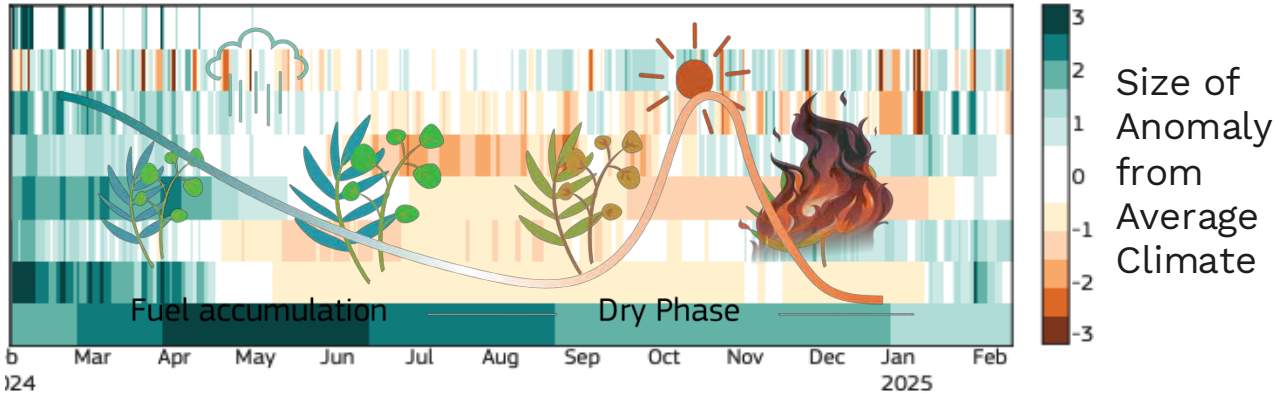
Low humidity

↓

Abundance of dry fuel

↑

Deep soil water reserves



Size of Anomaly from Average Climate

Dr Doug Kelley & Dr Maria Barbosa | UKCEH

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Attribution & Projections

Focussed analyses of key regions:

- Southern California
- Northeast Amazonia
- Pantanal-Chiquitano
- Congo Basin

Climate Change Attribution

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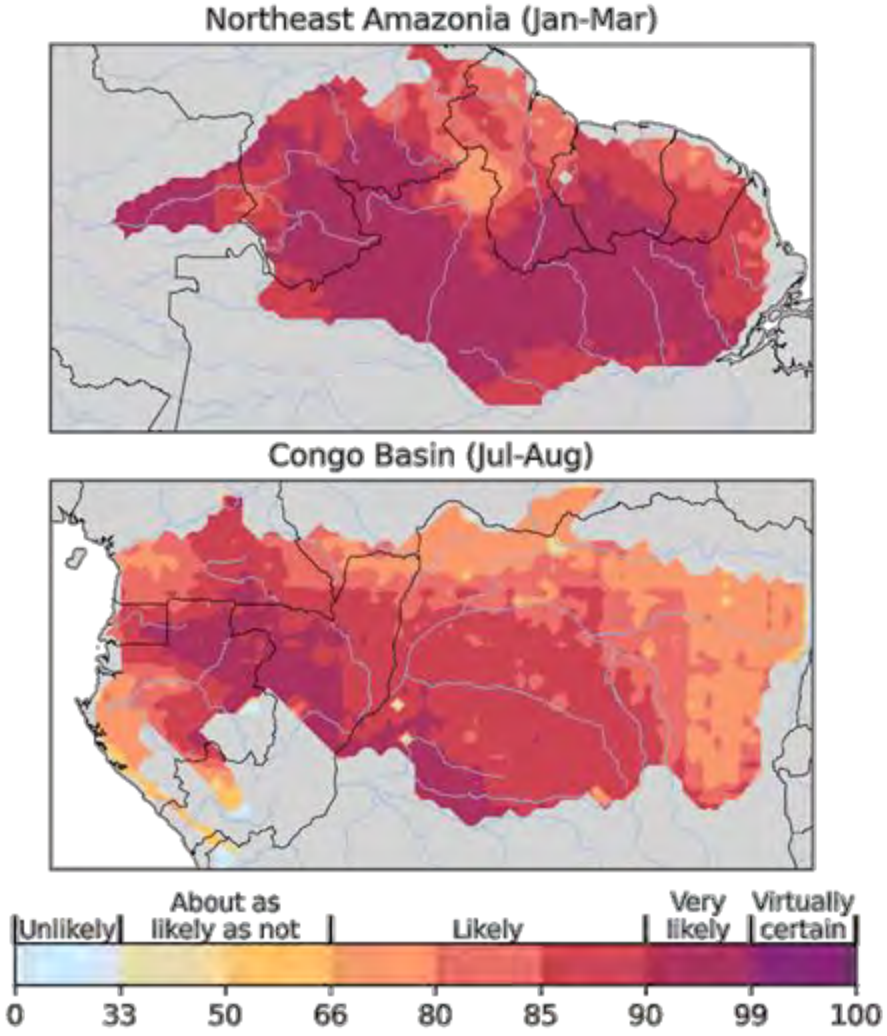
Anthropogenic climate change meant the extreme fire events of 2024-25 were:

2.1x more likely in **Northeast Amazonia**

3.3x more likely in **Pantanal-Chiquiano**

2.3x more likely in **Southern California**

1.6x more likely in the **Congo Basin**



Probability of greater burned area than in a world without climate change

Climate Change Attribution

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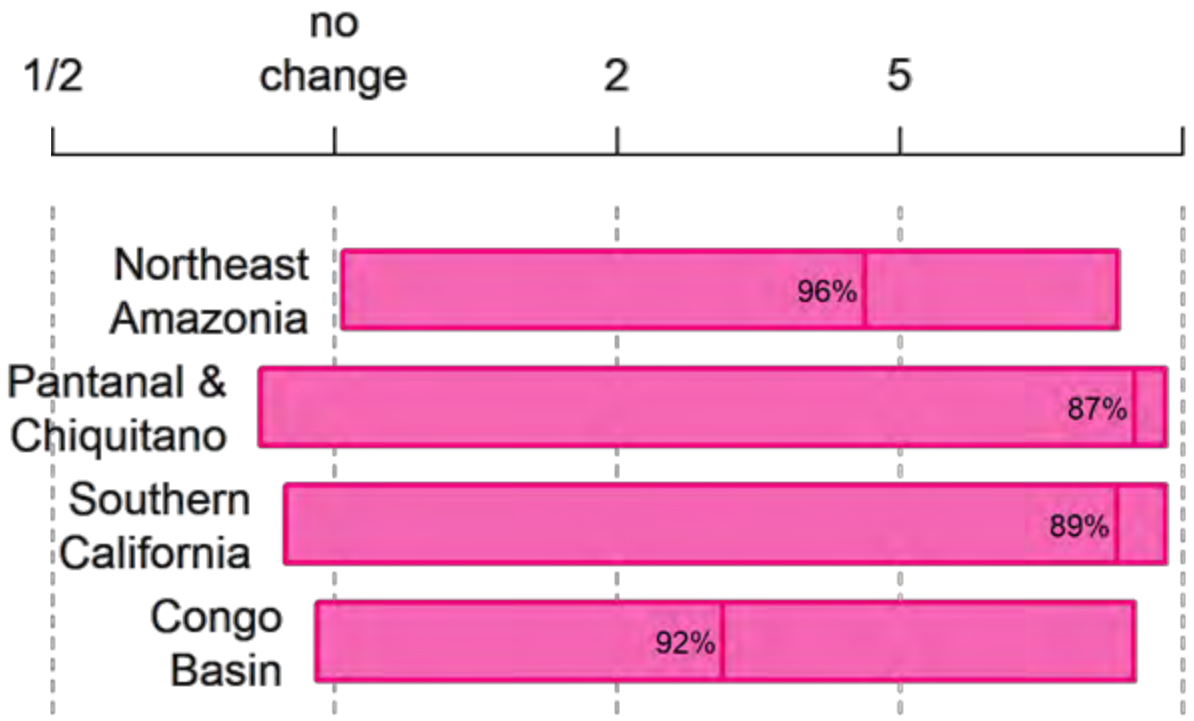
Anthropogenic climate change meant the extreme fire events of 2024-25 were:

~4x Larger overall burned area **Northeast Amazonia**

~34x Larger overall burned area **Pantanal-Chiquiano**

~25x Larger overall burned area **Southern California**

~3x Larger overall burned area **Congo Basin**



We assessed **multiple lines of evidence**, each pointing to the **same conclusion — climate change** is making fire weather **more intense and the areas burned larger.**

Changing Risk of Events like 2024-25 through 2100

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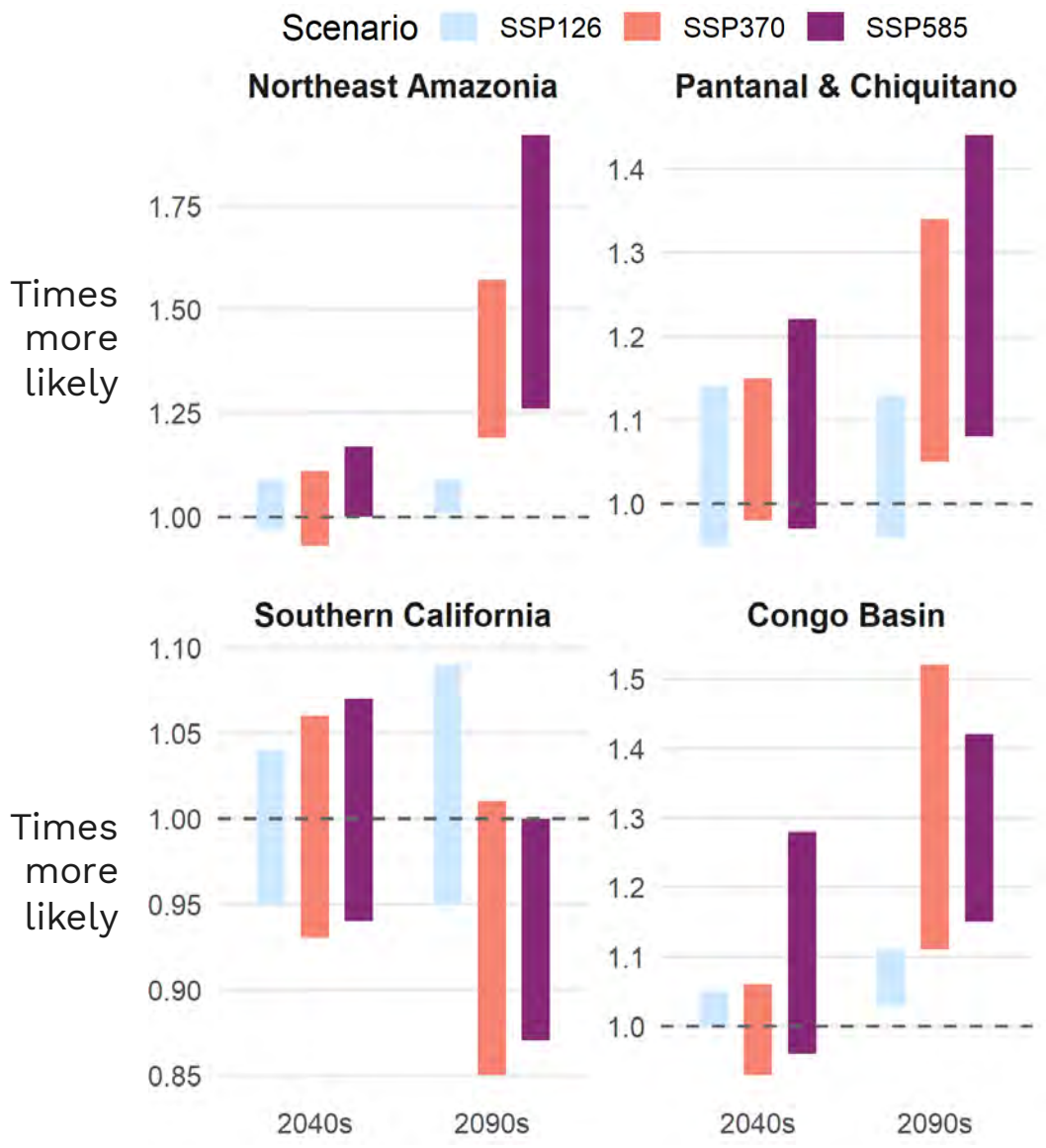
Fires on scale of 2024-25 will occur:

19-57%	more frequently by 2100 in **Northeast Amazonia** under medium-high emissions path
1-9%	more frequently under low emissions path
5-34%	more frequently in **Pantanal-Chiquitano** under medium-high emissions path
Max 13%	more frequently under low emissions path
11-52%	more frequently in the **Congo Basin** medium-high emissions path
3-11%	more frequently under low emissions path



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Under a medium-high (SSP370) emissions pathway,
a person born in Northeast Amazonia today has a

52-69%

likelihood of experiencing at least one 2024-scale extreme fire season in their lifetime.

This is significantly greater than the 33-36% likelihood faced by someone born in the 1940s.

Dr Francesca Di Giuseppe | ECMWF

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Eye towards the 2025-26 fire season

With focus on UK and Europe

Firefighters battle moorland wildfires in Scotland (SGA media)

Predicting the 2025 Fire Season

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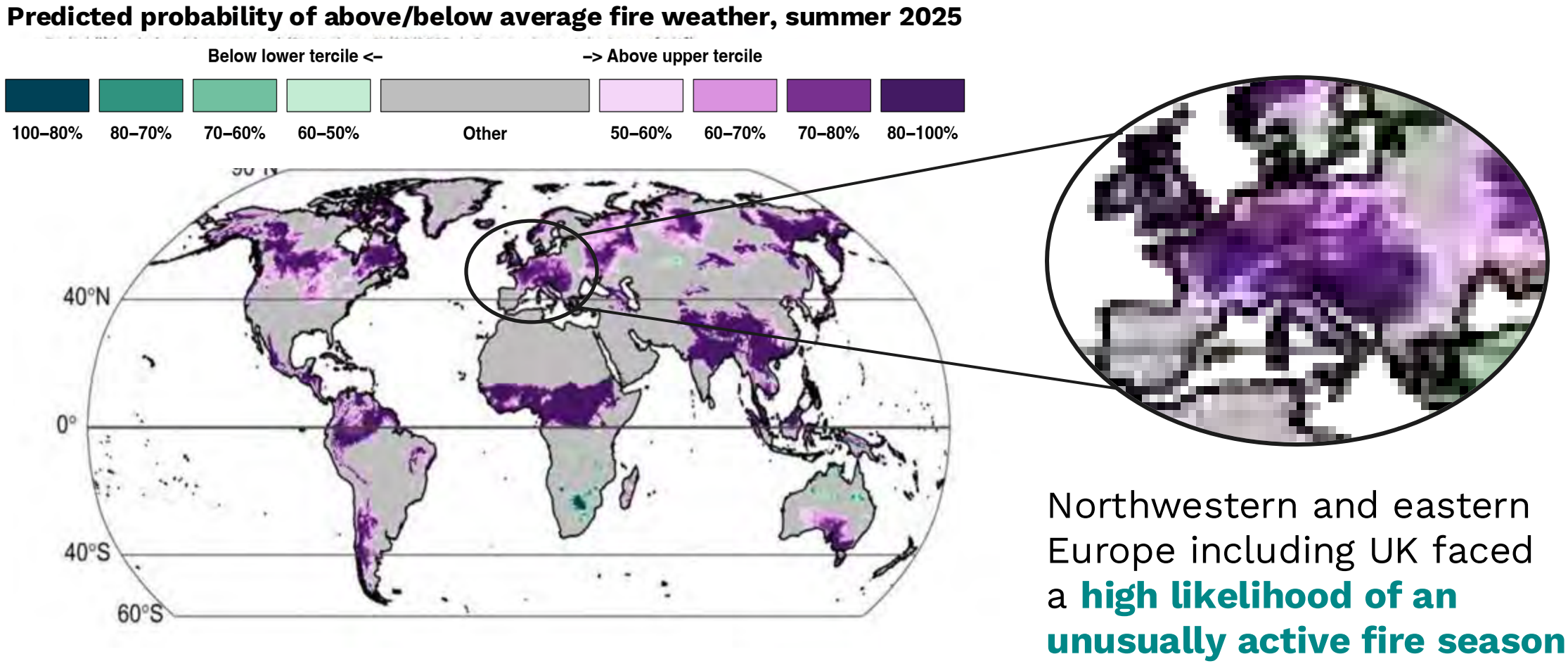

Northwestern and eastern Europe including UK faced a **high likelihood of an unusually active fire season**.

Exceptional Fire Season in the UK, 2025

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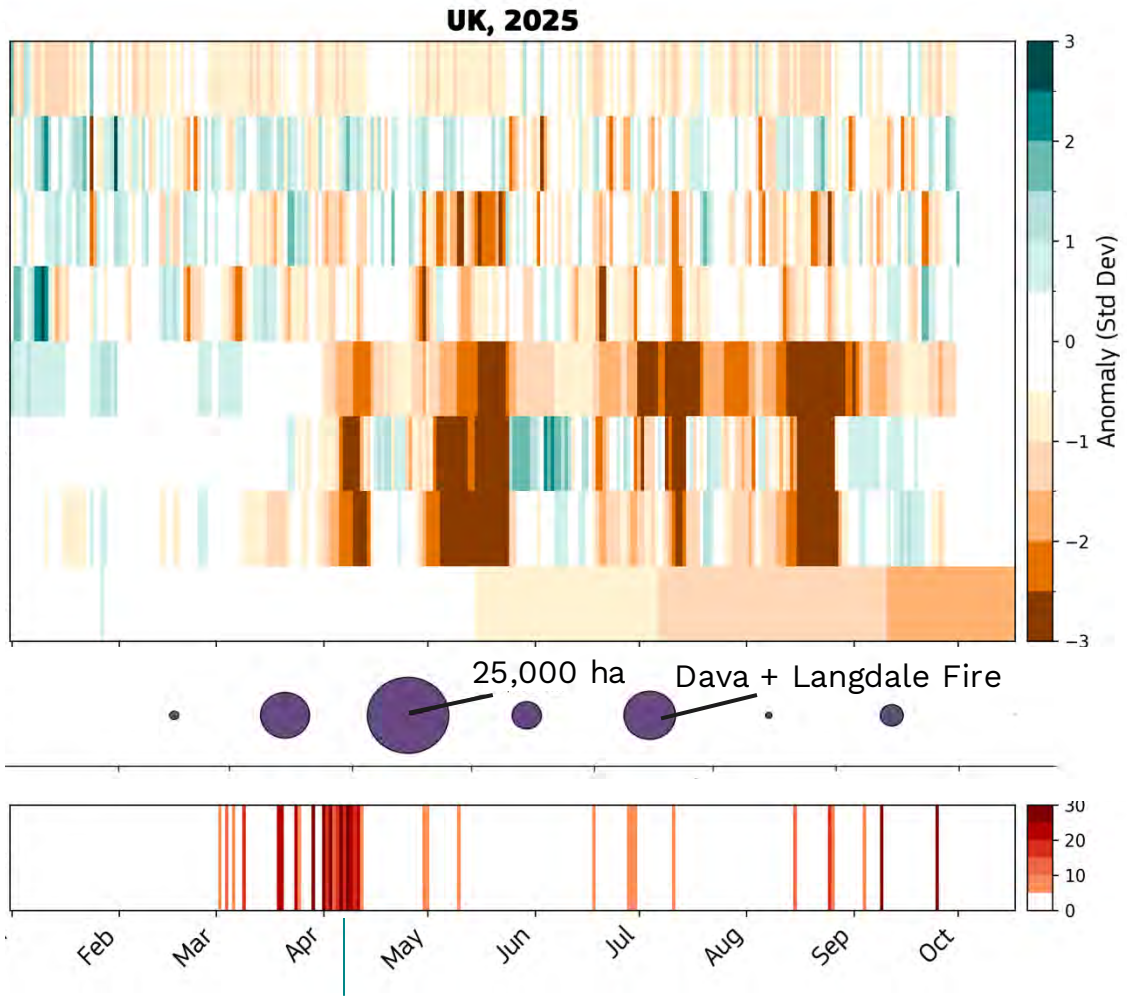
-50% below average Spring rainfall

~1.5°C warmer than average

Fuel Conditions (over 3σ drier)

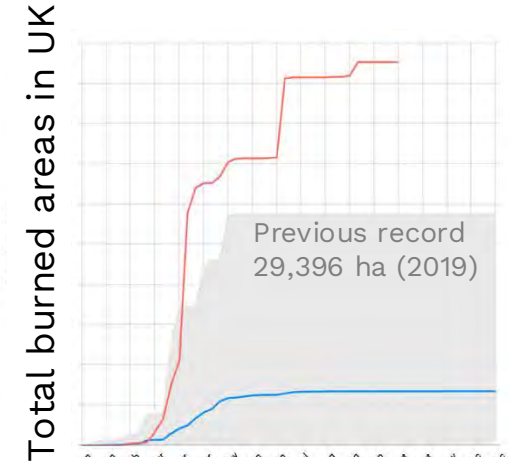
Extremely dry soil



46 concurrent fires on 8 April

Second highest number of UK fires on record for a single day

Record total burned area:
49,328 hectares



Dr Douglas Kelley | UKCEH

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Call to Action at COP30

Extreme fire seasons in South America precede this year's COP in Brazil

Hot Topics for COP30: Wildfires & Climate Policy

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Carbon Accounting

Problem: National GHG inventories consider wildfire emissions (on managed land) as neutral over time, but rising frequency & severity of fires due to climate changes causes a net carbon loss to the atmosphere.

Response: Inventory methodologies & UNFCCC reporting guidelines could better capture the net impact of wildfires on atmospheric CO_2.

Carbon Projects & Climate Finance

Problem: Wildfire is a risk to the permanence of some forest carbon projects (used for offsetting emissions).

Response: Wildfire risk must be considered in project design, independently assessed and monitored through carbon ratings and governance frameworks, and impacts mitigated through insurance and buffer pool mechanisms.

Loss & Damage

Problem: Wildfires are not recognised explicitly in the global Loss & Damage agenda, in the same way as other climate-related hazards. Fires are treated as caused by local factors, rather than global climate change.

Response: The UN Loss & Damage Fund should recognise wildfires, opening opportunities to fund wildfire recovery efforts in developing countries.

Take-Homes

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Global warming is making extreme wildfire more likely and more severe. Some of the most prominent wildfires of the 2024-25 global wildfire season, in LA and South America, were **2-3x more likely due to climate change**, and the area burned 25-30x larger.

Consequences of the extreme wildfires of 2024-25 were severe, and included: **fatalities**, **mass evacuations, economic damage, deadly air pollution**, and **vast greenhouse gas emissions** from carbon-rich forests.

One key path to avoiding these consequences is clear: **reduce global emissions rapidly**, now.

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Thank you

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