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SCIENCE BEHIND THE NEWS

Record-Breaking 2025 European Wildfires Concentrated in Northwest Iberia

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At the end of August 2025, the total burned area (BA) in Europe reached ~1 million hectares (Mha), the highest on record (https://forest-fire.emergency.copernicus.eu/apps/effis.statistics/seasonaltrend). More than half of this total (~541,000 ha) was concentrated within only ~2% of the EU area, in a ~15 Mha region in the north-west of the Iberian Peninsula (NW-IP; Figure 1a) and developed over just a few weeks in August (Keeping et al. 2025). For several days, large wildfires burned in the region, prompting military support and the first-ever activation of the European Civil Protection Mechanism in Spain. The fires caused severe environmental and socio-economic impacts, including at least eight fatalities and large-scale evacuations (https://www.euronews.com/2025/08/17/wildfires-in-spain-and-portugal-force-evacuations-and-deployment-of-thousands-of-emergency; Keeping et al. 2025).

The fires occurred during an intense 16-day heatwave across southwestern Europe in August (https://climate.copernicus.eu/surface-air-temperature-august-2025). As a consequence, the Fire Weather Index (FWI), a fire danger metric which combines temperature, humidity, wind, and precipitation, was particularly high in the NW-IP, with August 2025 showing the most extreme monthly fire-weather conditions in the 1985–2025 period (Figure 1b). According to the World Weather Attribution rapid assessment, human-caused climate change has made the kind of extreme fire-weather conditions observed in August 2025 roughly 40 times more likely and about 30% more intense, but this attribution refers only to meteorological hazard (fire-weather conditions), not ignition probability or BA (Keeping et al. 2025).

Within the NW-IP, August 2025 reached a record-high value over the period 1985–2025 for BA too (Figure 1c). The second-largest monthly BA occurred in October 2017, outside the typical summer fire season and during the exceptional windy conditions associated with Hurricane Ophelia (Ramos et al. 2023). Monthly BA and FWI are positively associated (Spearman $\rho = 0.73$, $p < 0.001$; after removing the annual cycle $\rho = 0.55$, $p < 0.001$). However, the response is non-linear: below FWI 15, most months lie well under the BA 95th percentile, and BA increases rapidly once it exceeds FWI ~20 (Figure 1c). At high FWI, dispersion widens, indicating that extreme fire weather is necessary but not sufficient for extreme BA. In addition, summer FWI shows a significant positive trend over the 1985–2025 period (Theil–Sen = +1.18 FWI units per decade; Kendall $p = 0.013$), and high monthly FWI has become more prevalent in recent years (red symbols in Figure 1c, 2006–2025). By contrast, summer BA remains highly variable and does not show a comparably clear long-term increase (Theil–Sen = −4324 ha per decade; Kendall $p = 0.041$). This divergence suggests that, beyond meteorological hazard, changes in suppression capacity, fuel

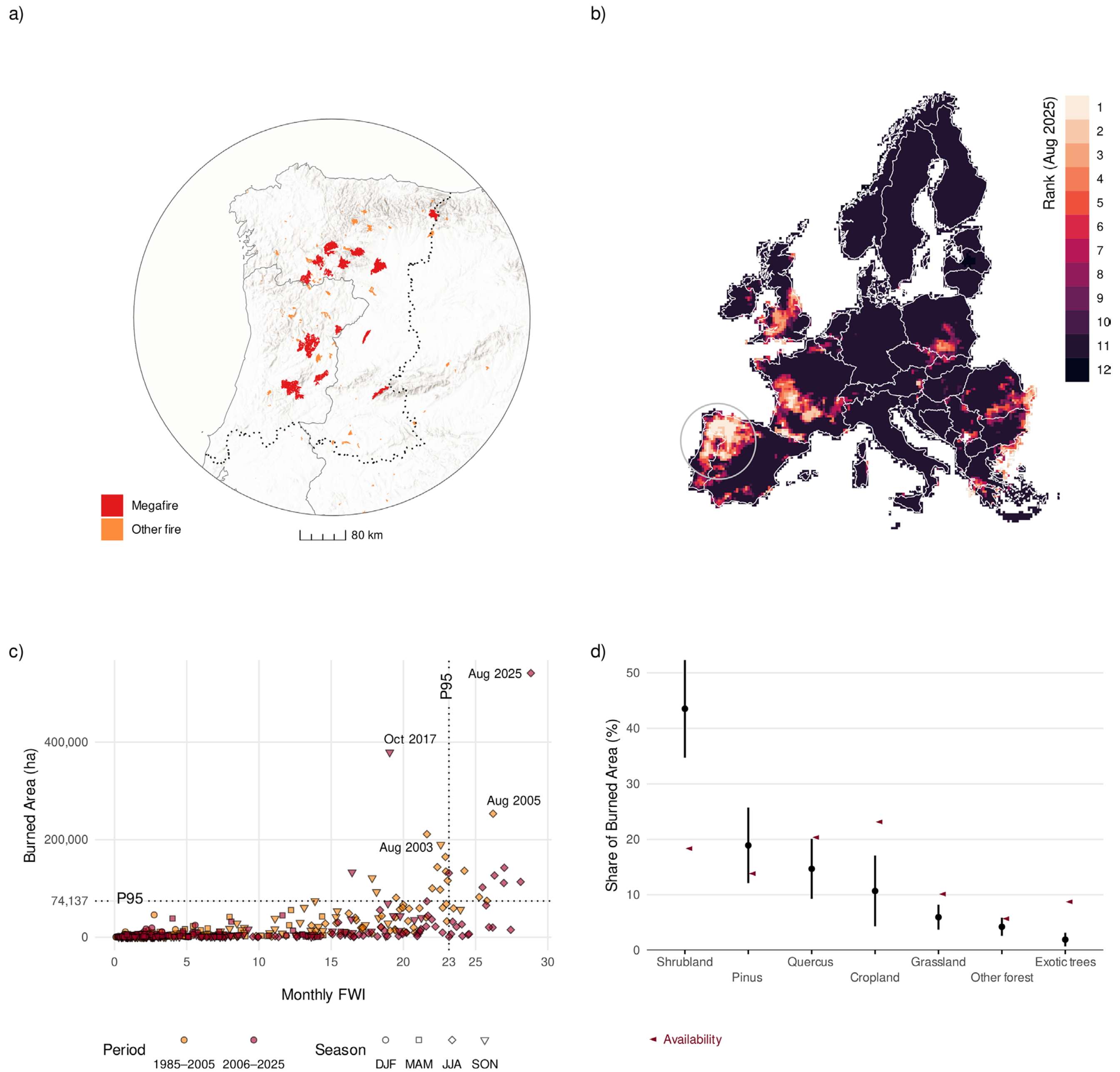

FIGURE 1 | (a) Burned area (BA; https://forest-fire.emergency.copernicus.eu/) in August 2025 across the northwest of the Iberian Peninsula (NW-IP; orange), highlighting megafires (> 10,000 ha; red). (b) Ranking of the Fire Weather Index (FWI; https://ewds.climate.copernicus.eu/datasets/cems-fire-historical-v1) across Europe for August 2025, based on the 1985–2025 monthly values. The rank is computed by ordering all monthly FWI values from January 1985 to August 2025. The NW-IP region of interest is outlined. (c) Scatterplot of monthly BA versus FWI in the NW-IP for 1985–2025. BA time series combines the EFFIS database (https://forest-fire.emergency.copernicus.eu/) and the EFFIS Sentinel-2/MODIS polygons (2016–2025; https://forest-fire.emergency.copernicus.eu/), overlapping for 2008–2015 with a Spearman correlation of 0.88 ($p < 0.001$). Horizontal and vertical dashed lines represent the 95th percentiles of BA and FWI, respectively. (d) Burn selectivity in August 2025 for the NW-IP: black dots show the fraction of BA for each vegetation class (https://www.miteco.gob.es/es/cartografia-y-sig/ide/descargas/biodiversidad/mfe.html; https://snig.dgterritorio.gov.pt). "Pinus" and "Quercus" include natural, semi-natural, naturalized and plantations of native species. The red triangles indicate the presence of each class in the study area (i.e., what fraction of that vegetation class would have burned if fires were equally affecting all vegetation classes). Black error bars are 95% confidence intervals estimated through a conservative leave-one-fire-out jackknife. Replicable code and data are available at 10.5281/zenodo.17775863.

structure, and broader human–environment factors also modulate burned area on decadal scales (e.g., Fréjaville and Curt 2017).

Why was 2025 so extreme? Fire size depends on the duration of fire-conducive weather and the extent of continuous fuels in the landscape (Pausas and Keeley 2021). What burns, therefore, also matters. The August 2025 fires in the NW-IP showed strong burn selectivity, with shrublands contributing a disproportionate share of BA relative to their availability within the domain (Figure 1d). This is consistent with the high fuel density, flammability, and spatial continuity in these vegetation types (Repeto-Deudero et al. 2025). Other classes burned proportionally less than their availability, including exotic tree plantations. These are mainly concentrated on the coast, while these fires occurred mostly inland. Given recent concerns that protected areas might be disproportionately affected by wildfires, we compared the observed share of BA within them (32.3% with 95% jackknife CI values in the range: 17.6–47.0) with the share of protected land in the study area (25.2%). We thus found no robust statistical evidence that fires preferentially impacted protected areas during this extreme fire month. The result that shrublands, a natural fine-fuel dominated ecosystem in the area, were disproportionately affected suggests that decades of forest destruction, land abandonment, and effective suppression may have increased their area and continuity across the NW-IP (Viedma et al. 2015; Moreira et al. 2020). Antecedent weather may also have contributed to increasing the availability of fine fuels. These fuel beds met extreme fire-weather conditions, resulting in multiple near-synchronous large fires (Figure 1a), several of which exceeded fire suppression capacity.

We hope this note helps ignite immediate action and stimulate urgent, detailed assessments and planning. To keep summers like 2025 exceptional rather than the new norm, action is needed across all dimensions of risk—hazard, exposure, and vulnerability—through coordinated mitigation and adaptation. Mitigation is essential: reducing greenhouse gas emissions is the primary lever to limit the increase in extreme fire-conducive weather (Abatzoglou et al. 2025; Keeping et al. 2025). Adaptation should prioritize targeted land-use planning, fuel reduction in strategic locations, careful forest management, and investment in community resilience and recovery support. This implies shifting from predominantly reactive suppression toward proactive strategies that reduce vulnerability and exposure. Prevention must be treated as a strategic priority, as escalating wildfires threaten populations, infrastructure, and economic stability (Cunningham et al. 2025), making fire resilience a matter of national security as well as environmental protection (AghaKouchak et al. 2025).

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The authors have nothing to report.

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