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PERSPECTIVE

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Megafire: An ambiguous and emotive term best avoided by science

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Abstract

Background: As fire regimes are changing and wildfire disasters are becoming more frequent, the term megafire is increasingly used to describe impactful wildfires, under multiple meanings, both in academia and popular media. This has resulted in a highly ambiguous concept.

Approach: We analysed the use of the term 'megafire' in popular media to determine its origin, its developments over time, and its meaning in the public sphere. We subsequently discuss how relative the term 'mega' is, and put this in the context of an analysis of Portuguese and global data on fire size distribution.

Results: We found that 'megafire' originated in the popular news media over 20 years before it appeared in science. Megafire is used in a diversity of languages, considers landscape fires as well as urban fires, and has a variety of meanings in addition to size. What constitutes 'mega' is relative and highly context-dependent in space and time, given variation in landscape, climate, and anthropogenic controls, and as revealed in examples from the Netherlands, Portugal and the Global Fire Atlas. Moreover, fire size does not equate to fire impact.

Conclusion: Given the diverse meanings of megafire in the popular media, we argue that redefining megafire in science potentially leads to greater disparity between science and practice. Megafire is widely used as an emotive term that is best left for popular

The author team is a diverse combination of people working on integrated fire management, from Master students and PhD candidates to academics, a consultant and a fire chief. Team members have their roots across temperate and Mediterranean Europe, North America (USA), Latin America (Ecuador), Africa (Ghana) and Oceania (Australia).

media. For those wanting to use it in science, what constitutes a megafire should be defined by the context in which it is used, not by a metric of one-size-fits-all.

1 | INTRODUCTION

As fire regimes are changing around the world and fire suppression is becoming increasingly challenging, living or coexisting with fire is an important step for society to make, which requires a basic acceptance of fire in the landscape (Moritz et al., 2014; Newman Thacker et al., 2023; Stoof & Kettridge, 2022). A major challenge in achieving this acceptance of fire is the typically negative and sometimes dramatic way that fire is portrayed in the media, in terms of visuals (e.g. aerial firefighting) as well as language. 'Megafire' is an example of an ambiguous term that is now increasingly used in the scientific literature (Linley et al., 2022). It was reportedly first used in the peer-reviewed literature in 2005 (Linley et al., 2022), to denote fire size ('the largest fires', Stephens & Ruth, 2005) and complexity ('these few fires exhibit fire behavior characteristics that exceed all efforts at control, regardless of the type, kind, or number of firefighting assets that are brought to bear', Williams et al., 2005). As global fire size distribution varies directly or indirectly with climate and with anthropogenic suppression (Hantson et al., 2015; Kelley et al., 2019), the perception of megafires tends to reflect local conditions, with the ambiguity of the term making it a 'problematic one' (Tedim et al., 2018). Linley et al. (2022) recently conducted a review of scientific literature highlighting the ambiguity of 'megafire' in science, being typically used to describe fire size, but also behaviour, resistance to control, novelty, severity, as well as environmental and social impact. To standardize the scientific meaning of 'megafire', Linley et al. (2022) then proposed to redefine megafires as 'fires >10,000 ha arising from single or multiple related ignition events'. While we fully agree with the value of standard terminology, we argue that redefining a term widely used outside academia has the risk of creating a disconnect between science and practice and suggest avoiding the term or leaving the term megafire to popular media.

To support this reasoning, we analysed the use of the term 'megafire' in popular media focusing on news items in ten Latin and Germanic languages. We then discuss the origin of the term 'megafire', its developments in time, and its meaning in the public sphere. We subsequently discuss the relativity of the very informal term 'mega' and put this in the context of an analysis of Portuguese and global data on fire size distribution. Based on this, we conclude that wildfire size should not be conflated with the social-ecological impacts of wildfires and discuss the risk of scientifically redefining an ambiguous and informal term.

2 | METHODS

2.1 | Use of 'megafire' in the public sphere

Adopting similar search terms and languages as Linley et al. (2022), we searched NexisUni (LexisNexis, n.d.) to collect data about the use of the term *megafire* in English, Spanish, Portuguese, Italian, Catalan, Galician, Romanian, French, German and Dutch using the search terms *megafire*, *megaincendi**, *megafogo*, *mégafeu*, *megafeuer* and *megabrand*, respectively. Where possible the exact search terms were used as Linley et al. (2022), but because of the large diversity of languages in the public news media some search terms required

TABLE 1 Overview of search terms used in the various languages.

Exact search term used	Language	Notes
megafire or mega-fire or megafires or mega-fires	English	Linley et al's search term megafir* also included results for megafirst, so search term was updated to avoid this
megaincendi* OR mega-incendi*	Catalan, Galician, Italian, Portuguese, Romanian and Spanish	This term included megaincendi (Catalan), megaincendio (Spanish, Galician, Italian), megaincêndio (Portuguese), megaincendiu (Romanian) and their dashed and plural forms
megafogo* OR mega-fogo*	Portuguese	The asterisk ensures also the plural forms are included
mégafeu OR mégafeux	French	Linley et al's search term mégafeu* also included German language results, so search term was updated to avoid this
megafeuer OR megafeuern OR mega-feuer OR mega-feuern	German	–
megabrand OR mega-brand OR megabranden OR mega-branden	Dutch	Results were filtered for Dutch language items only, to filter out English articles about large brand names

Note: An asterisk denotes one or multiple wildcard characters, to allow searching for variations on the root word—explained in the Notes column.

slight updating (see Table 1). We searched for the singular version of the term as well as their plural versions and dashed versions (e.g. megafire, mega-fire, megafires, mega-fires). Articles were classified as covering landscape fires when they reported on wildfires, fires in forest or other vegetation, or if the word megafire was listed in the context of climate change or other natural hazards such as floods and earthquakes. Articles considering fires in vehicles, factories or houses were classified as urban fires, and if fire type was not clear from the article, then the article was classified as 'unclear'.

To create the temporal overview of the use of megafire in the chosen languages, we conducted searches for each search term listed in Table 1, on 30 May 2022 and 19 June 2023. The search was restricted to News Items published on or before 29 May 2022 (first set) and on or before 18 June 2023 (second set). In addition, we searched for the number of news items about megafires in Australia (details in Table A2) on 5 June 2022, focusing on items published between 1 Jan 2019 and 31 Dec 2020.

For the analysis of how megafire and its international sibling terms (Table 1) are used in the public sphere, we conducted a search on 24 May 2022, focusing on news items published between 1 April and (including) 15 May 2022 ($n=204$). All articles were read and the meaning of megafire was determined based on the definition given in the article (if any) or inferred from the text, focusing on the text adjacent to the word megafire. The meaning was listed as unclear if it could not be inferred from the text or if the full text article was not available (e.g. behind a paywall or if the link did not function, $n=8$) and the meaning could not be inferred from the few lines of text available in NexisUni.

Additional details in support of this analysis are given in Appendix A and data provided in Appendix A and Stoof et al. (2023).

2.2 | Analysis of Portuguese and global fire size distribution data

The change in the 99.9th percentile of fire size in Portugal was assessed using two official data sources, both produced by the *Instituto da Conservação da Natureza e das Florestas*. For fires larger than 1 hectare, a database of individual fire records was used, built from files for individual time periods available at https://www.icnf.pt/florestas/gfr/gfrgestaoinformacao/estatisticas. Mapped burn patches, which included fire complexes and merged individual fires, came from individual files per time period or year (https://www.icnf.pt/florestas/gfr/gfrgestaoinformacao/estatisticas) and were used for fires larger than 35 hectares; this cut-off value accounts for the minimum fire size mapped during 1980–1983. For both datasets, all fires occurring within a specific decade were grouped and then the 99.9th percentile value of their size was taken.

The Global Fire Atlas is described in (Andela et al., 2019); data are available at https://daac.ornl.gov/cgi-bin/dsviewer.pl?ds_id=1642. For each landcover class, the number of fires ≥10,000 ha in the 13 year-long dataset was determined as well as the burned area that can be attributed to these fires ≥10,000 ha. The share of burned area of fires ≥10,000 ha was then calculated using the total burned area by landcover class. Finally, the 99.9th percentile of fire size within each land cover class was determined for the entire dataset.

3 | MEGAFIRE'S ORIGIN IN THE PUBLIC SPHERE

The temporal analysis of 'megafire' in popular media showed that the term was first used by the British Insurance Association regarding very large urban fires in 1984, and by *The Globe and Mail* (Canada) regarding a 'massive blaze' 'threatening the small northwestern community of Red Lake', Ontario, in 1986. These first appearances in the public media occurred 19–21 years before *megafire* was reportedly first used in the peer-reviewed literature (Linley et al., 2022; Stephens & Ruth, 2005; Williams et al., 2005). This suggests the term megafire was in use, undefined and not described for roughly two decades. After megafire first appeared in 1985, it was followed by *megaincendi** (1994), *megabrand* (1995), *megafeuer* (2002), *méga-feu* (2003) and *megafogo* (2018; Table A1).

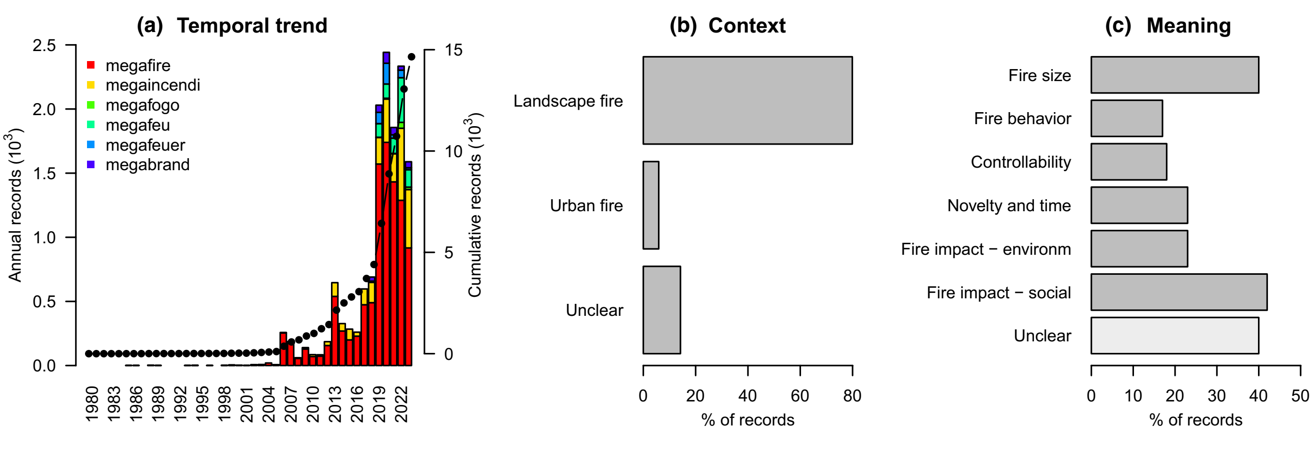

FIGURE 1 Megafire in the media: (a) temporal trend, (b) context in which the term was used and (c) meaning of the term. The legend in panel (a) shows the simplified search terms; panel (a) contains data up to 18 June 2023, panel (b, c) consider items published 1 April–15 May 2022.

Altogether the term was seldom referred to until 2006, with its use strongly increasing by 2019 (Figure 1a). The stark rise in the term megafire in popular news outlets beginning in 2019 is likely attributed to the 2019/20 Black Summer bushfires in Australia, as 61% of all megafire news in 2019 and 2020 contained the word Australia. These fires were often very large (compared to the typical fire size in the area) and characterized by extreme fire intensity, exceeded control capacity, occurred in usual and very unusual places, and had major environmental and social impacts (Davey & Sarre, 2020). The trend shown in Figure 1a is similar to that of peer-reviewed literature (Figure 1, Linley et al., 2022) but the total number of items in the popular media is over twenty times higher (14,651 news items versus 563 academic papers). Seventy five percent of these items were in English (megafire $n=10{,}123$), with the remainder of items in the other languages (*megaincendi** $n=2433$, *megafogo* $n=78$, *mégafeu* $n=829$, *megafeuer* $n=386$, *megabrand* $n=802$; see Table A1 for exact search terms and languages). The language diversity of megafire occurrence in public use was thereby much greater than found in the scientific literature (English: $n=557$; Portuguese: $n=2$; and Spanish: $n=4$; Linley et al., 2022), confirming the term is used around the world. The widespread use of megafire outside of academia, and much earlier than in the scientific literature, suggests that the scientific literature is learning from the public media rather than the other way around. In addition, inconsistencies over the definition and use of the term megafire to describe fire size, fire behaviour, controllability, novelty and time, environmental impacts, social impacts ebbed and flowed within (and arguably between) the scientific literature and popular media during this period. For example, the analysis of how megafire and related terms have been used in the public sphere reveal that 80% of news items published between 1 April and 15 May 2022 ($n=204$) considered megafires in the landscape, 6% considered urban fires and for 14% it was not clear how megafire was used (e.g. full article not available, off-topic or context not clear); Figure 1b. In items that considered *landscape fires*, megafire had a variety of meanings (Figure 1c), often spanning multiple categories. Social impacts were most ubiquitous at 42%, followed by fire size (40%, reporting a wide variety of sizes), environmental impact (23%), novelty (23%), fire behaviour (17%) and fire controllability or the lack thereof (18%); for 66 out of 163 landscape fire articles the meaning was unclear. A total of 97 out of 163 landscape fire media articles did not consider megafire in terms of size (60%), and if size was considered, 88% of articles (58 out of 66) included at least one other criterion.

This analysis shows that megafire in popular news outlets has been used longer, to a much greater degree, and in greater language diversity than in academic outlets. It is used not only for landscape fires but also for urban fires and for different meanings other than size. Multiple meanings of megafire in popular media, and the scientific standardization of megafires simply in terms of size may contribute to ambiguity of the term, especially when it concerns fires that are experienced as 'mega' by stakeholders and publics directly affected but may not be 'large' per se.

3.1 | Size is relative

The first definition of mega in the Cambridge Dictionary (Cambridge Dictionary, 2023) is 'slang' (very informal language) to describe something very good or very big. This classification is inherently subjective because what is large in one place or time can be very small in another. As such, mega finds its linguistic analogues among descriptors like cold, warm, dry, wet, sunny, far, marginal and high. For example, soils considered marginal in places with highly fertile land may be the best soils in places challenged by rockiness or lack of drainage (Richards et al., 2014). Moreover, few people may realize that the very low-lying Netherlands has *bergen* ('mountains'), such as the 52-m high Grebbeberg that was of strategic importance during World War II due to its hilltop advantage. Natural processes and landscape features are highly dependent on the climatic, geographic and human or cultural contexts they exist in. Likewise, fire and its potential size and impact are context dependent and determined by the amount, type and landscape connectivity of fuel, that is burnable biomass, its moisture content and atmospheric conditions (Bradstock, 2010).

For example, during a stakeholder event in the Netherlands, a landowner referred to the 2020 fire in De Meinweg National Park as a *megabrand* (megafire). It burned ~200 hectares in The Netherlands and into Germany, and was a multiday, multistakeholder, transboundary emergency in which 1850 Dutch and German fire fighters were deployed and for which 4200 people were evacuated at the height of the COVID-19 pandemic (Instituut Fysieke Veiligheid, 2020). An impactful event, despite ~200 hectares being a relatively small fire by international standards. Was this landowner wrong to call it a megafire? We argue they were not. In a country where fire weather is typically mild, landscape fuel connectivity is low and the average fire size is 1–2 hectares (San-Miguel-Ayanz et al., 2019), it is understandable that a fire of ~200 ha is called mega. Particularly if one considers that a 710-ha fire burning at the same time (Stoof et al., 2020) may be the Netherlands' largest fire in at least 50 years. Conversely, within the flammable Mediterranean Basin, a 10,000-ha threshold value is more in line with Linley et al.'s (2022) definition of a megafire. At the same time, 10,000-ha fires can be seen as a normal occurrence in the sparsely inhabited and seasonally dry African savannah or Western Australian landscapes where the largest fires are two orders of magnitude larger than the threshold suggested by Archibald et al. (2010), Kelly et al. (2013), Linley et al. (2022).

As the scientific literature on fire tends to be dominated by work on developed and traditionally fire prone countries (Haghani et al., 2022), the literature review undertaken by Linley et al. (2022) is likely biased towards these much-studied regions and underrepresents regions that (also) have smaller fires, like parts of Africa (Roteta et al., 2019) and temperate Europe (San-Miguel-Ayanz et al., 2019), or that have much larger fires, up to 4 million hectares in Australia in the Global Fire Atlas (Andela et al., 2019). From this perspective, a statistical extreme (a given percentile) offers a better depiction of how large or extreme a fire is according to its spatio-temporal domain (Bowman et al., 2017; Pausas & Keeley, 2021). For

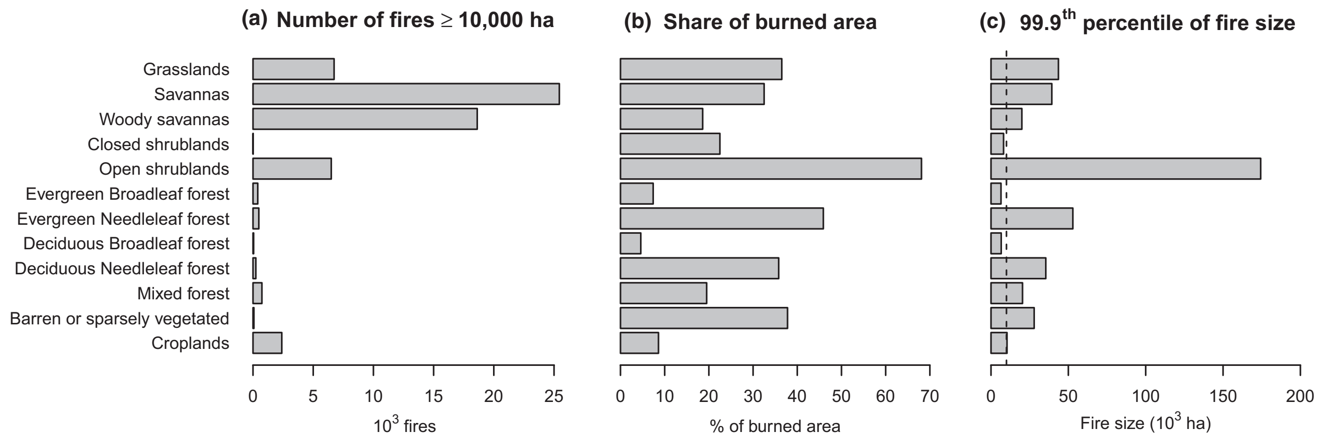

FIGURE 2 Fire size is context dependent, illustrated using Global Fire Atlas data (2003–2016; Andela et al., 2019). (a) Number of fires ≥10,000 ha, (b) their corresponding share of total burned area and (c) the 99.9th percentile of fire size distribution by land cover. In (c), the 10,000-ha threshold (Linley et al., 2022) is indicated by a vertical dashed line.

example, Fernandes et al., (2016a); defined an extremely large fire in Portugal as one attaining 2500 ha, approximately in the 99.9 percentile of fire-size distribution. Using data from the Global Fire Atlas (Andela et al., 2019) that contains fires >20 ha, Figure 2 illustrates the context-dependency of large fires, as both the number of fires >10,000 ha (Figure 2a) and their share in the burned area (Figure 2b) strongly vary by land cover, and the same holds for the 99.9th percentile of fire size by landcover (Figure 2c). Grass-dominated land cover types (grasslands, savannas and woody savannas) account for more than half of the global number of fires >10,000 ha (Figure 2a) and are the main constituent of the pyrome (a region of the world with a given fire regime) characterized by frequent, intense and large fires (Archibald et al., 2013). However, it is in open shrubland that fires >10,000 ha are the largest and by far the most prevalent (Figure 2b,c), typifying the rare-intense-large pyrome, together with Mediterranean, temperate and boreal forests subject to crown fires. The extremes of fire size possible in remote boreal conifer forests and arid shrublands coincide with minimum anthropogenic influence but very different fuel conditions (Andela et al., 2019). While vegetation in boreal forests is abundant but is seldom available to burn, open shrublands are invariably dry but have relatively low fuel load, implying that fire size is constrained by weather and drought in the former and by fuel connectivity in the latter (Andela et al., 2019; Kelley et al., 2019).

With changing fire regimes, it has been previously shown that temporal trends in fire size and severity are also contextual: statistical extremes of large fire sizes in the USA have for instance increased since the 1980s (Iglesias et al., 2022), and in Figure 3 we show a similar increasing trend for Portugal (see Appendix A for methods), presumably a combined outcome of increased landscape-scale forest and shrubland connectivity (Duane et al., 2021; Fernandes, Barros, et al., 2016a; Fernandes, Monteiro-Henriques, et al., 2016b) and more extreme fire weather (Turco et al., 2019). Changes in the statistical distribution of fire size, namely as an outcome of increasingly larger fires or of increasingly more frequent large fires, may affect how their seriousness is perceived. Thus, while percentile-based

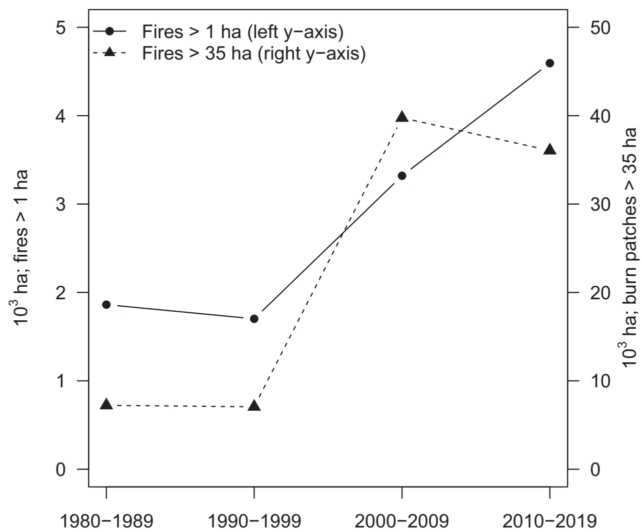

FIGURE 3 Temporal change in the 99.9th percentile of the fire size distribution in Portugal.

thresholds have the benefit of being context-dependent and thus being adaptable to local or regional conditions, the drawback of this approach may be that shifting baselines may cause a risk of banalizing events that are extreme in terms of fire behaviour and potential or actual environmental and societal impacts. Alternatively, data can be compared to historical baselines. However, the accuracy and nature of such baselines, as well as the frequency of data collection vary greatly from region to region, depending on their resources and the impact and frequency of fires in those regions.

3.2 | Size and the extreme attributes of a wildfire can differ substantially

Ultimately, megafire is used as an emotive term, used to describe something that far exceeds what is perceived as normal. While the original Latin meaning of large can be applied, it cannot realistically be cleansed of its emotive nature. Fire size is likely the primary focus because the size of large fires is relatively easy to measure; or possibly the result of the work of fire services, for whom size is a measure of the work done. Yet fires are not suppressed everywhere in the world, and without a culture of putting all fires out, very large fires can be viewed as normal. Stephens et al. (2014) suggested the 10,000-ha threshold for a megafire but argued that "mega-fires are often defined according to their size and intensity but are more accurately described by their socio-economic impacts". A multitude of fire sizes will arise from any given wildfire impelled by elevated fire danger (e.g. Reilly et al., 2022), depending on the extent of fire growth limitation by environmental conditions and fire-suppression effectiveness. Thus, it may additionally be argued that the overall seriousness of a fire outbreak should be gauged by its compounded effects rather than whether it formed a single burned area.

Fire size may correlate with fire behaviour and in turn with fire severity and impacts (e.g. Fernández-Guisuraga et al., 2023). Yet, the largest fires are not necessarily the fastest spreading fires nor the highest-intensity fires (Laurent et al., 2019). Likewise, high fire intensity does not automatically equate with high potential soil impacts (Stoof et al., 2013) and even wildfires >100,000 ha can be dominated by low to moderate burn severity (Potter & Alexander, 2022) or exhibit highly heterogeneous burn severity (Lydersen et al., 2014). Conversely, homogeneously dry landscapes and topographic positions are expected to burn severely independently of fire size (Noske et al., 2016). Prescribed fires can exceed 10,000 ha (Weir & Scasta, 2022), as well as wildfires managed for resource objectives, e.g. Donager et al. (2022). Fire size does not equate to human impacts - in Australia, house loss, human fatalities and economic loss are predicted from the combination of energy release rate and exposure to the fire (Harris et al., 2012), and the deadliest single wildfire event in Europe was the 1431-ha Mati fire in Greece, 2018 (102 fatalities; Xanthopoulos & Athanasiou, 2019). Furthermore, while the June 2017 Pedrogão Grande fire in Portugal grew to almost 30,000 ha, 65 out of a total of 66 human fatalities occurred before attaining 10,000 ha (Guerreiro et al., 2017). Focusing megafires on size rather than impacts will likely favour further equating wildfire effects to burned area and not to damage, as discussed by Moreira et al. (2020).

4 | CONCLUSION

Megafire has a rich meaning and long history in the public sphere, spanning the diversity of aspects and impacts that can make a fire 'mega' in a certain time and space. Williams et al. (2005) argue that megafires "are not defined in absolute terms, using physical measures (e.g., acres burned)" but instead their complex and destructive dimensions reveal their intangible (emotional and political) nature. Complexity and destructiveness are not solely, or sometimes not at all, determined by fire size and reflect the biogeographic and socio-economic contexts (Bowman et al., 2017). What makes a fire complex or destructive is the degree to which landscapes, communities and emergency services are adapted and prepared for it, which is inherently context-dependent. This context-dependence of large fires is also acknowledged by Linley et al. (2022). Redefining megafire to a one-size-fits-all approach limited to fire size does not capture its rich and diverse use and has the risk of creating a disconnect between science (Linley et al., 2022) and practice (Figure 1). While Linley et al. (2022) aimed to reach possible consensus about megafires, they also recognize that not everyone will agree with their chosen terminology and "welcome debate on the issue" (pp. 1915). Thus, our concern is with the implications of their definition in academia as well as in public discourse.

We argue that megafire sensationalizes language to describe fires and suggest avoiding the term altogether in scientific discourse. Within the scientific literature, if a term is needed to denote large fires, fires can simply be referred to by their size (e.g. a fire >10,000 or 100,000 hectares) or if reliable fire statistics are available, to their percentile (e.g. a fire size of >99.9th percentile). For those who desire to use the term megafire for scientific inquiry, we suggest clearly stating the context, definition, and specifics of megafire following Linley et al. (2022): considering fire size, behaviour, resistance to control, novelty, severity, as well as environmental and social impact. Clear specification of the context of megafire will better inform the reader, aid in the assessment of fire impacts and implications and will facilitate broader comparisons of studies on wildfire events.

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CONFLICT OF INTEREST STATEMENT

None.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available in the supplementary material of this article or from resources available in the public domain and cited in the manuscript or in the supplementary material. The raw data for the NexisUni analysis (full list of news items) as well as the R script used to create the figures is available from Stoof et al. (2023). The text of the news items exported from NexisUni is available from the corresponding author upon request.

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BIOSKETCH

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APPENDIX A

Methods and data—Megafire: an ambiguous and emotive term best avoided by science.

1. Nexis Uni analysis (additional information) and data.

   Temporal overview of the term megafire

All results were exported in a (set of) Microsoft Excel files for each search. For megafogo, mégafeu, megafeuer and megabrand, a single download for each search was sufficient. For megafire and megaincendi*, the total number of records exceeded the maximum download size of NexisUni to Microsoft Excel (1000 records). As such, separate downloads were made and results subsequently aggregated into a single file. The year of the oldest record and the total number of records by search term are included in Table A1.

Analysis of how megafire and its international sibling terms was used in the public debate: Overviews of news item results were exported in one Microsoft Excel file per search. The full articles were subsequently exported to pdf. For all search terms except megafire, a single pdf-export for each search was sufficient. For megafire, the total number of records exceeded the maximum download size of NexisUni to pdf (100 records). As such, two separate downloads were made. The total number of records by search term is included in Table A1.

All analyses: No duplicates were removed as we considered that any duplicate news items meant that the news report had been distributed to a larger audience, which was relevant information Tables A1-A5.

2. Results of Portuguese and global fire size distribution analysis: Table A6 and Table A7.

TABLE A1 NexisUni results by search term used.

Exact search term used	Oldest record	Nr records incl duplicates ≤ 18 June 2023	Nr records incl duplicates 1 April–15 may 2022
megafire OR mega-fire OR megafires OR mega-fires	1984	10,123	145
megaincendi* OR mega-incendi*	1994	2433	44
megafogo* OR mega-fogo*	2018	78	2
mégafeu OR mégafeux	2003	829	6
megafeuer OR megafeuern OR mega-feuer OR mega-feuern	2002	386	3
megabrand OR mega-brand OR megabranden OR mega-branden	1995	802	4
Total	–	**14,651**	**204**

Note:An asterisk denotes one or multiple wildcard characters, to allow searching for variations on the root word

TABLE A2 NexisUni search for megafires between 1 January 2019 and 31 December 2020.

Exact search term used	Number of records including duplicates
megafire OR mega-fire OR megafires or mega-fires	3311
megafire OR mega-fire OR megafires OR mega-fires AND Australia	2032

TABLE A3 Timeline of the use of megafire and its translations in NexisUni, data for Figure 1a.

Year	megafire	megaincendi*	megafogo	megafeu	megafeuer	megabrand
1980	NA	NA	NA	NA	NA	NA
1981	NA	NA	NA	NA	NA	NA
1982	NA	NA	NA	NA	NA	NA
1983	NA	NA	NA	NA	NA	NA
1984	NA	NA	NA	NA	NA	NA
1985	1	NA	NA	NA	NA	NA
1986	1	NA	NA	NA	NA	NA
1987	NA	NA	NA	NA	NA	NA
1988	3	NA	NA	NA	NA	NA
1989	1	NA	NA	NA	NA	NA
1990	NA	NA	NA	NA	NA	NA
1991	NA	NA	NA	NA	NA	NA
1992	NA	NA	NA	NA	NA	NA
1993	1	NA	NA	NA	NA	NA
1994	1	1	NA	NA	NA	NA
1995	NA	NA	NA	NA	NA	1
1996	1	NA	NA	NA	NA	NA
1997	NA	NA	NA	NA	NA	NA
1998	2	NA	NA	NA	NA	NA
1999	3	2	NA	NA	NA	3
2000	3	NA	NA	NA	NA	2
2001	1	NA	NA	NA	NA	NA
2002	7	NA	NA	NA	1	7
2003	8	NA	NA	5	1	5
2004	20	NA	NA	NA	1	NA
2005	6	1	NA	NA	NA	16
2006	254	4	NA	NA	NA	5
2007	178	9	NA	NA	1	22
2008	56	5	NA	NA	NA	44
2009	128	12	NA	NA	4	44
2010	70	15	NA	NA	3	42
2011	73	11	NA	NA	1	145
2012	156	30	NA	NA	1	20
2013	539	107	NA	NA	11	54
2014	269	58	NA	NA	NA	28
2015	200	84	NA	2	1	8
2016	229	31	NA	NA	1	2
2017	474	123	NA	NA	5	46
2018	490	159	2	2	5	32
2019	1571	207	2	106	88	56
2020	1740	338	6	111	162	85
2021	1432	219	3	119	26	57
2022	1288	562	46	348	59	31
2023	917	455	19	136	15	47

Note: Full search terms are listed in Table A1, and data for 2023 are until and including 18 June 2023 Tables A2–A7.

Abbreviation: NA, not applicable (no data).

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TABLE A4 Data for Figure 1b, context of megafire, total $n = 204$.

Type	Number (% of total)
Landscape fire	163 (79.9)
Urban fire	12 (5.9)
Unclear	29 (14.2)

TABLE A5 Data for Figure 1c, meaning of megafire, total $n = 163$.

Type	Number (% of total)
Fire size	66 (40.5)
Fire behaviour	28 (17.2)
Controllability	29 (17.8)
Novelty and time	37 (22.7)
Fire impact	107 (65.6)
Unclear	66 (40.5)

Note: Note that multiple meanings can apply, unless the term is unclear, in that case the other meanings do not apply.

TABLE A6 Data for the temporal change in the 99.9th percentile of the fire size distribution in Portugal.

Period	Fires > 1 ha	Fires > 35 ha
1980–1989	1862	7227
1990–1999	1702	7065
2000–2009	3320	39,751
2010–2019	4594	36,058

TABLE A7 Cumulative data for the number of fires ≥10,000 ha, their corresponding share of total burned area, and the 99.9th percentile of fire size distribution by land cover in the Global Fire Atlas, 2003–2016 (Andela et al., 2019).

Land cover	Number of fires ≥ 10,000 ha	Share of burned area of fires ≥ 10,000 ha (%)	99.9th percentile (ha)
Grasslands	6735	36.5	43,591
Savannas	25,442	32.5	39,315
Woody savannas	18,622	18.6	19,958
Closed shrublands	10	22.5	8119
Open shrublands	6500	68.1	174,325
Evergreen Broadleaf forest	396	7.4	6453
Evergreen Needleleaf forest	484	45.9	52,915
Deciduous Broadleaf forest	51	4.6	6603
Deciduous Needleleaf forest	237	35.8	35,419
Mixed forest	741	19.5	20,372
Barren or sparsely vegetated	76	37.8	27,895
Croplands	2391	8.6	10,354
Total	**61,685**	**27.7**	**27,739**