Fatal lightning strikes in Ireland from newspaper records 1900–2024

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Introduction

Lightning is a commonly experienced geophysical phenomenon. It produces the brightest light and the loudest sound commonly occurring on Earth (Dwyer and Uman, 2014). Most lightning is generated in summer thunderstorms; however, it can occur during any season (Bates *et al*., 2015).

While lightning is commonplace, the phenomenon remains relatively poorly understood; there is no reliable information that exists for lightning fatalities globally (Cooper *et al*., 2017). For example, two different studies estimate global lightning fatalities at 6000 and 24 000 annually, highlighting major gaps in reporting and record keeping and methodology (Cardoso *et al*., 2014; Holle, 2016). While Cardoso *et al*. (2014) derive their estimate from reported national lightning fatality statistics, Holle (2016) incorporates adjustments for underreporting in many regions, resulting in a considerably higher estimate. A better understanding of lightning fatalities can help benefit society. As the prevalence of lightning fatalities has declined over the course of the last century in many countries, it is possible that an appreciation for this hazard among many people has also diminished (Curran *et al*., 2000; Holle, 2016; Elsom, 2018). However, not all countries have experienced a decline in fatalities over time. A mortality rate of 1.8 deaths per million in 2018, compared with 0.9 per million in 2010 was noted in Bangladesh, while the average annual lightning fatalities per state in India increased from 38 during 1967–2002 to 61 during 2003–2020, representing an increase of just over 60% (Khan *et al*., 2024; Mishra *et al*., 2024). Understanding lightning fatalities can help in identifying high-risk groups and settings, such as outdoor workers or people who engage in certain kinds of leisure activities. By examining aspects of fatal events, such as seasonality, location and the meteorological conditions most associated with fatalities, it is possible to help inform public awareness, outdoor safety planning and forecasting.

While fatalities due to lightning strikes in Ireland are now uncommon, the early decades of the twentieth century saw a far greater prevalence of such events. Most literature dedicated to the study of fatal lightning strikes is concerned with the USA, where fatalities have reduced from a maximum of 450 annually during the early twentieth century to less than 30 deaths per year recently (Lopez and Holle, 1998; Curran *et al*., 2000; Roeder *et al*., 2015; Holle, 2016). Substantial research has also been conducted in recent years on fatal lightning strikes in the United Kingdom (UK), where fatalities have decreased significantly from 1.1 deaths per million people per year in the 1850s to 0.01 by the 2010s (Elsom and Webb, 2014; Elsom, 2015, 2018). Such declines are observed throughout North America and western Europe and have been largely attributed to reduced occupational exposure due to urbanisation and mechanisation, alongside safer buildings, a shift away from outdoor work-related activities, and increased public awareness and advancements in weather forecasting (Elsom and Webb, 2014; Holle, 2016). Outside of the UK and USA, there have been other studies dedicated to fatal lightning strikes for countries such as Bangladesh, Australia, Romania and Germany, among others (Coates *et al*., 1993; Dewan *et al*., 2017; Antonescu and Cărbunaru, 2018; Bingert *et al*., 2024). While a limited number of studies have partially dealt with lightning in Ireland (included as part of a broader assessment based on the UK), there is no study concerned solely with lightning fatalities in Ireland (Elsom and Webb, 2016; Sleiwah *et al*., 2018; Wilkinson and Neal, 2021).

A key challenge to assessing lightning fatalities is associated with a lack of data. However, newspaper archives have proven to be a valuable resource when faced with the challenge of a lack of relevant datasets concerning weather events and impacts. Examples of this can be seen in Jobbová *et al*. (2024), who developed a 287-year database from newspaper articles to gain a better understanding of drought impacts in Ireland. Similarly, Jeffers *et al*. (2023) used newspaper articles to construct a historical record of wildfires on the island of Ireland. Given their rarity, fatalities from lightning strikes are also likely to be newsworthy. This study aims to construct a chronology of fatal lightning strikes in Ireland from 1900 to 2024 using historical newspaper archives and to analyse their temporal, spatial, behavioural and meteorological characteristics. By linking fatal events to synoptic weather patterns through the Lamb weather types (LWT) synoptic classification, this study seeks to identify high-risk conditions and activities, and provide historical context for a hazard that rarely results in fatalities today.

Data and methods

A record of fatal lightning strikes was compiled using the Irish Newspaper Archive (INA, www.irishnewsarchive.com), which offers digital and searchable access to newspaper publications on the island of Ireland dating from 1733 to the present day. The archive includes over 6 million pages of newspaper content from over 100 titles. Fewer titles are present during the earliest years; however, due to improved printing technology and a growing demand for printed news, a significant rise in the number of newspaper titles is observed from the beginning of the archive to present (Jobbová *et al*., 2024; INA, n.d.). During the 1740s, at the beginning of the archive, there were consistently fewer than ten titles. The number of titles does not begin to significantly increase until the middle of the nineteenth century when this number doubled to around 20 before rising to 30 by the end of that century. The growth continued into the twentieth century; just over 40 titles existed at the start of the century, rising to more than 50 by the 1910s. The number of titles in the archive does not fall below 40 for the remainder of the twentieth century and is subject to a significant increase during the twenty-first century, reaching 60 titles or more. Despite covering the island of Ireland, the archive has a greater number of titles present for the Republic of Ireland compared to Northern Ireland; at the county-level, Dublin has the largest number of titles.

A chronology of fatal lightning strikes in Ireland was assembled using the INA dating from 1900 onwards, given the greater stability in the number of titles in the archive during that period (Jobbová *et al*., 2024). Relevant articles detailing fatal lightning events were accessed through the use of the search engine provided within the archive's database using relevant key words and phrases such as 'killed by lightning', 'fatal lightning' and 'death by lightning'. A time sensitive filter was then applied to search for these key words and phrases for each year from 1900 up to 2024. Once a relevant article was identified, information including the date of the fatal event, the number of fatalities and location of event, the activity the victim was involved in when struck by lightning, and relevant contextual details were collated. Care was taken to avoid duplication of events across different titles. The resultant dataset accounts for 94 separate fatal lightning events spanning from 1900 up to the most recent fatal lightning event in Ireland, which occurred in 2008. A total of 113 people died during those 94 events.

The resultant dataset was analysed to identify annual and monthly variations in fatalities, to assess temporal trends and to map the spatial distribution of events to assess regional patterns. The activities of victims at the time of death were also categorised and evaluated. Finally, LWTs specific to Ireland (Fealy and Mills, 2018) were used to evaluate the synoptic conditions most typically associated with fatal lightning events.

LWTs categorise different weather types through three main categories: Anticyclonic, Directional and Cyclonic (Table 1). Each category is also associated with a directional component such as southerly (S) and westerly (W), paired with anticyclonic (e.g. ANE) or cyclonic (e.g. CNE) conditions. Traditionally, this classification system has been applied to daily sea-level pressure, centred on a domain over the British Isles (BI) (Jones *et al*., 1993). As Ireland lies on the western edge of this domain, Fealy and Mills (2018) refined the approach by developing an Ireland-centred domain using sea-level pressure data, providing a more accurate framework for interpreting synoptic weather patterns affecting the country. Here LWTs were extracted for Ireland using the approach of Fealy and Mills (2018) applied to the twentieth century reanalysis (Compo *et al*., 2011). Each fatal lightning event date listed in the chronology was matched with the LWT present on the day of the fatal lightning strike and the preceding 2 days of the event. The frequency and distribution of weather types associated with fatal events were then analysed and visualised.

Table 1

Lamb weather types (LWTs) classify daily weather types based on synoptic weather (Pardo et al., 2023).

	Lamb weather types				
	Anticyclonic		*Directional*		*Cyclonic*
A	Anticyclonic			C	Cyclonic
ANE	Anticyclonic northeasterly	NE	Northeasterly	CNE	Cyclonic northeasterly
AE	Anticyclonic easterly	E	Easterly	CE	Cyclonic easterly
ASE	Anticyclonic southeasterly	S	Southerly	CSE	Cyclonic southeasterly
AS	Anticyclonic southerly	SE	Southeasterly	CS	Cyclonic southerly
ASW	Anticyclonic southwesterly	SW	Southwesterly	CSW	Cyclonic southwesterly
AW	Anticyclonic westerly	W	Westerly	CW	Cyclonic westerly
ANW	Anticyclonic northwesterly	NW	Northwesterly	CNW	Cyclonic northwesterly
AN	Anticyclonic northerly	N	Northerly	CN	Cyclonic northerly

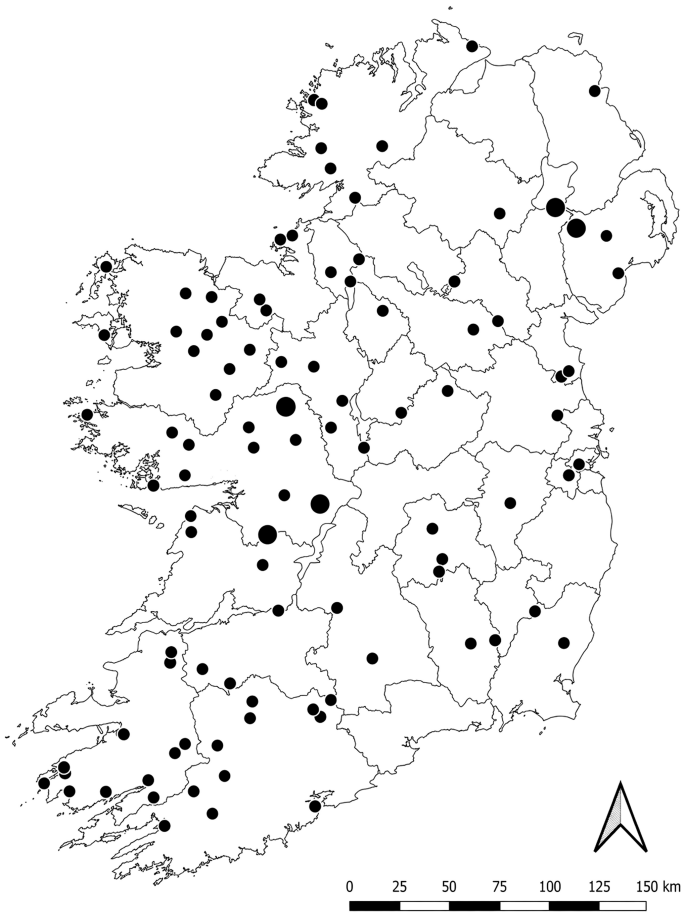

Figure 1. Map of the location of fatal lightning strikes in Ireland since 1900. The small black dots represent single fatalities, whereas the larger dots represent more than one fatality in an area.

Results

Patterns and trends in Irish lightning fatalities

The spatial, temporal, behavioural and meteorological trends associated with fatal lightning strikes in Ireland identified in newspaper archives from 1900 onward are examined below.

Figure 1 illustrates the geographic distribution of 94 fatal lightning strikes across Ireland since 1900. The distribution is widespread, affecting nearly every county, though there are notable clusters in the south and west, particularly in counties such as Kerry, Galway and Cork; there are fewer occurrences in the north and east of Ireland. Thunderstorm occurrence in Ireland varies spatially and seasonally with thunder reported more frequently in summer than in winter in most parts of the island; however, this is less pronounced in western and northern coastal districts (Rohan, 1975).

Temporal trends are evident in the chronology. It is noticeable that the earlier years of the chronology have a far higher prevalence of fatalities. The chronology begins with two fatalities in Kerry which occurred on 5 June 1900. '*Very melancholy news has reached here from the Waterville district*' began the article that detailed the misfortune of two women who were killed in separate locations in Kerry on the same day. The 1940s saw a rise in the number of fatalities from lightning with 14 losses of life. This period saw the greatest loss of life in one single event and location due to lightning in the chronology. On 31 May 1944, four young people (two men and two women) died while sheltering beside a turf bank at Gortacarnaun on the border of Galway and Clare. When a thunderstorm broke out, the four ran with others for shelter to an old turf bank. They were there only a short time when a '*blinding flash of lightning*' struck the bank killing the four and thrusting the 11-year-old sister of one of the victims 20 yards into a bog hole, which she survived.

There have only been two deaths in Ireland due to lightning strikes in the twenty-first century, according to the INA. A British soldier was struck dead by lightning while on a hike in the Mourne Mountains of Down in April 2006. The most recent fatality of lightning is reported on 12 April 2008, when a 14-year-old boy was killed just a few yards away from his home in Tallaght, Dublin. These examples reflect the broader trend of a declining rate of fatalities due to lightning strikes since 1900. Figure 2 shows that annual lightning fatalities in Ireland were relatively high during the early decades of the twentieth century, followed by a general decline, with a secondary peak around the mid-twentieth century; recent decades were marked by low numbers. The early decades of the twentieth century experienced more frequent deaths, particularly between 1910 and 1919. In contrast, recent decades (post-1980) have seen a marked decline, attributed to improved forecasting, public education and changes in lifestyle, including less people working outside and buildings which have become more resilient to lightning strikes (Elsom, 2018).

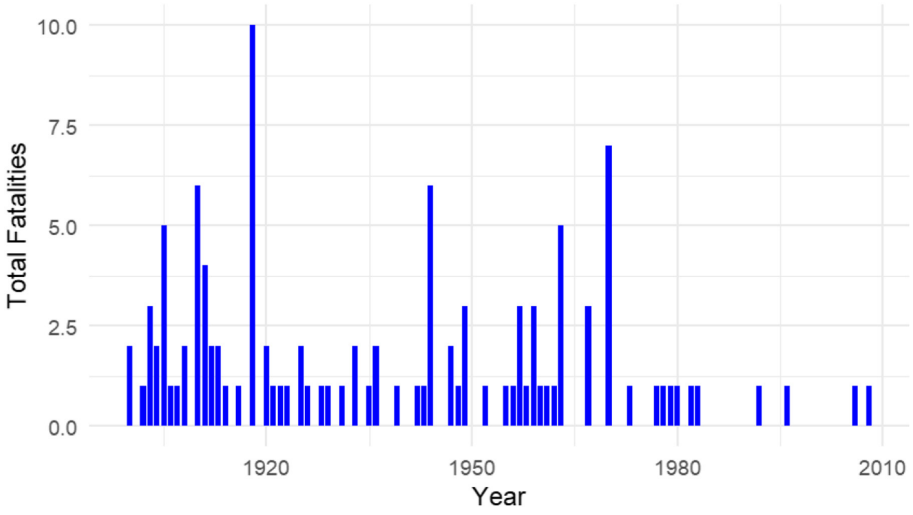

Figure 2. Annual number of lightning fatalities in Ireland, 1900–2024.

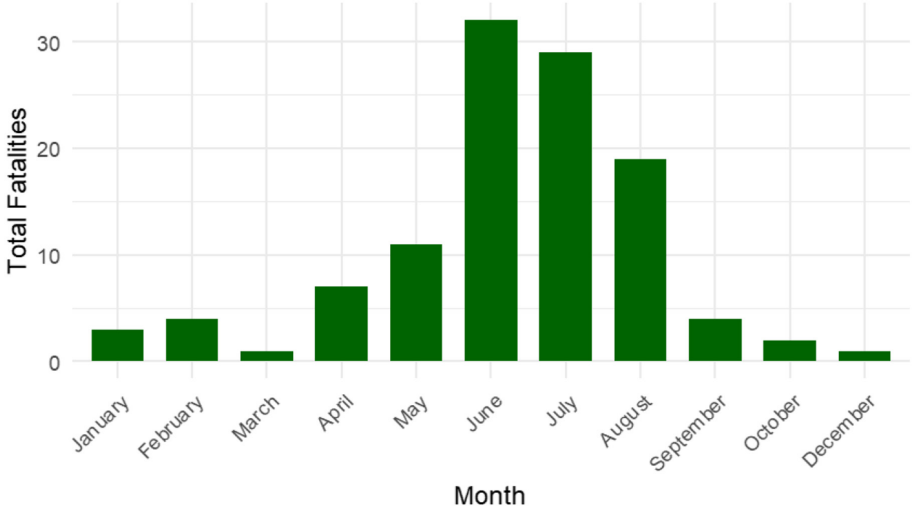

Figure 3. Monthly distribution of lightning fatalities in Ireland.

Lightning fatalities in Ireland have occurred throughout the year (Figure 3). However, most incidents occurred during the summer months, with June, July and August experiencing the highest number of fatalities: June and July alone account for the majority of deaths. This seasonal peak coincides with greater thunderstorm activity and increased outdoor exposure during warmer weather (Morgenstern *et al.*, 2022).

Figure 4 shows the distribution of lightning fatalities by activity for the earlier (1900–1959) and later (1960–2020) part of the series to show changes in activities associated with fatalities. 'Taking shelter' refers to instances when individuals sought protection from a thunderstorm within built structures, particularly open-air man-made features such as porches or bridges. 'Taking shelter outside', refers to when individuals sought protection in natural environments, such as beneath trees or hedges. Aside from walking or cycling, only two examples of leisure activities were recorded; both involved fishing and are represented by the 'By water' category. In both periods, the majority of fatalities occurred outdoors, with 57.5% of deaths (65) taking place during activities such as farming or working in bogs. Indoor fatalities were also relatively common in the earlier period, reflecting greater vulnerability within domestic environments. Other noticeably high activities associated with fatal lightning strikes are religious activities (including attending funerals, inside churches and saying the rosary at home) and activities in the kitchen. The most notable differences between the two periods are the sharp decline in indoor and domestic fatalities in the later period, together with a reduction in occupational activities, including farming and bog work, reflecting broader societal changes in exposure to lightning risk.

Synoptic context of Irish lightning fatalities

The most frequent weather pattern identified was two consecutive cyclonic days (C to C) before a fatal lightning event; such patterns occurred three times (Table 2). Other recurring patterns detected were characterised by an initial cyclonic day which was followed by directional weather types; such patterns included Cyclonic to Southerly (C to S) and Cyclonic to Westerly (C to W), both sequences were observed twice in the lead up to a fatal day. A sequence of Anticyclonic to Cyclonic (A to C) was also observed; this pattern occurred twice.

Figure 5 shows that Cyclonic (C) conditions are the most frequently recorded LWT, with a total of 20 fatal days. Cyclonic accounts for more than double the num-

ber of fatal days in comparison to the next most fatal weather type associated with fatal lightning events. This should be interpreted in the context of Ireland's climatology: cyclonic circulation patterns associated with passing Atlantic low-pressure systems occur frequently (Fealy and Mills, 2018). Anticyclonic (A) weather types were associated with eight fatal days. Other LWTs such as CS (Cyclonic Southerly), S (Southerly), CNW (Cyclonic North-westerly) and W (Westerly) each occurred between three and four times. Directional types like SE, SW and NW appear less often, typically only once or twice. Figure 5 also presents a small number of U (Unknown) days (5 days in total), which are days with LWT values that could not be clearly classified into cyclonic, anticyclonic or directional categories.

When all LWTs are merged under three broad categories: Anticyclonic, Cyclonic and Directional, again Cyclonic conditions account for the highest number of fatal days, with 36 occurrences (47.4% of total fatal days; 44% of total fatalities) (Figure 6). There were 21 fatal lightning days which experienced Directional weather (27.6% of total fatal days; 24% of total fatalities). Anticyclonic weather types accounted for the fewest days associated with fatal lightning, accounting for 14 days (18.4% of total fatal days; 26% of total fatalities). Five days in the dataset fall under the Unknown category (6.6% of total fatal days). Overall, the majority of fatal lightning events are associated with cyclonic or subcategories of cyclonic weather types, followed by anticyclonic days. Directional types are not as frequent.

Figure 7 displays the distribution of fatal lightning events during cyclonic weather across all 12 months. Peak fatalities tend to occur in the summer months, particularly June–August (yellow), when convective storms are more likely (Bates *et al.*, 2015). The late autumn, winter and early spring reflect periods of low to non-existent fatality rates. Only one event was recorded during the winter. The data indicates that fatal events during anticyclonic periods are distributed mostly between late spring and late summer. For directional weather types, the highest monthly count appears in June, with additional events present during the late spring through to the late summer (green). Only three events are seen to occur during the winter months. The distribution is weighted toward the middle of the year.

Discussion

This research presents and analyses a chronology of fatal lightning strikes in Ireland from 1900 to 2024 compiled using digitised newspaper archives. The results highlight that fatal lightning strikes in Ireland have declined significantly during the twentieth century. Geographically, fatalities can be found throughout the island; however, they are more concentrated in western and southern counties. Most fatalities occurred during outdoor activities and during the summer months, particularly under cyclonic weather conditions.

Our study offers not only insight into associated atmospheric conditions but also a reflection of twentieth century Irish society. The south and west had the most numerous concentrations of fatalities in Ireland, previous studies note that these regions experience relatively high frequencies of lightning activity (Wilkinson and Neal, 2021; Hayward *et al.*, 2022). The high incidence rate of fatal lightning strikes associated with farming, cutting turf, and religious gatherings (57.5% of all fatalities) points to a society where outdoor labour and active religious participation were common (Central Statistics Office, 2024). A significant portion of fatalities occurred indoors (28.3% of all fatalities), this reflects the low quality of housing and availability of protective infrastructure during this period (McManus, 2011). Many rural dwellings lacked lightning protection systems (e.g. lightning rods), electrical grounding or modern wiring and often used

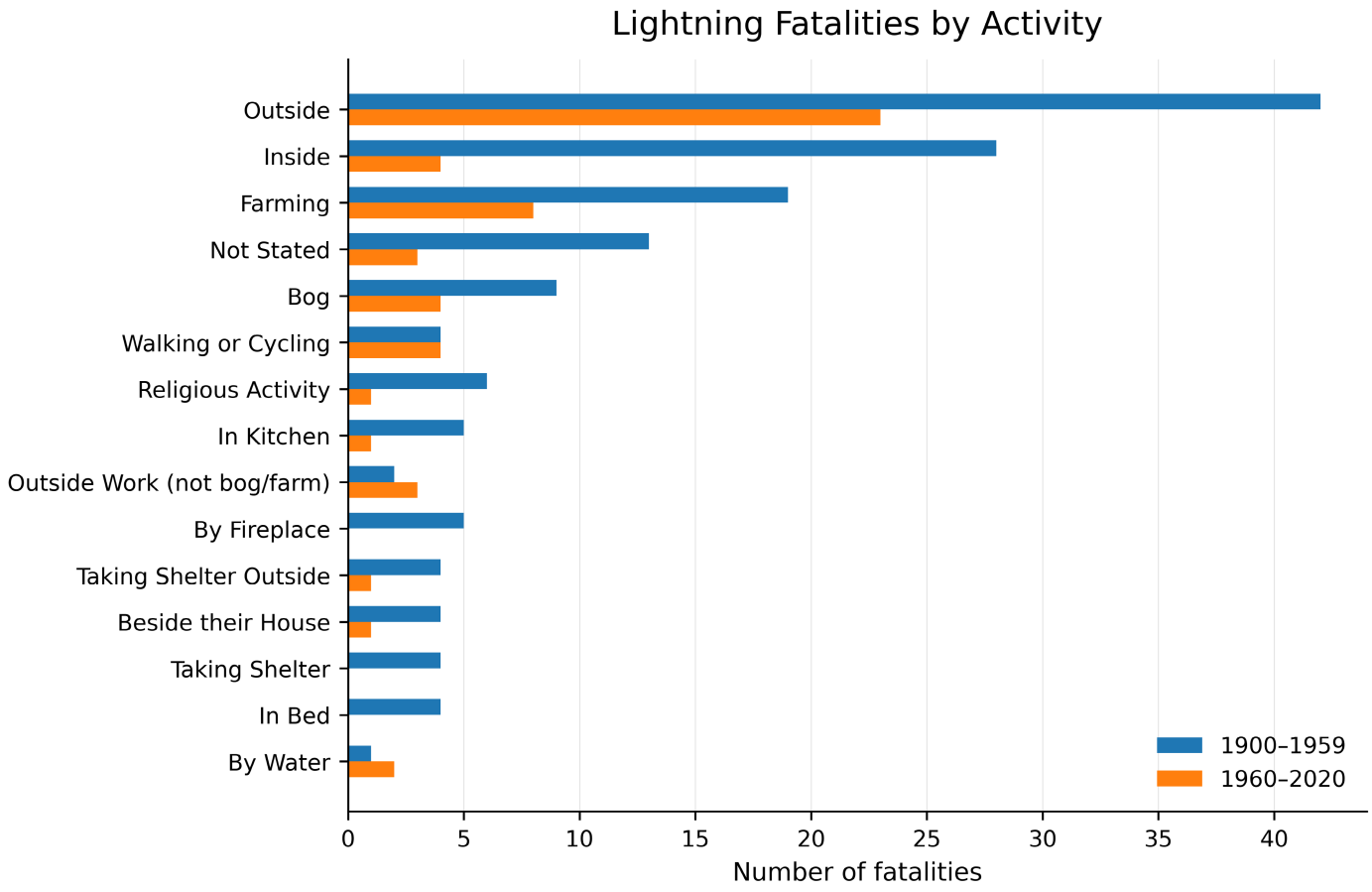

Figure 4. Lightning fatalities in Ireland by activity and time period (1900–1959 and 1960–2020). Bars indicate the number of fatalities associated with each activity, with blue representing 1900–1959 and orange representing 1960–2020.

Table 2

Most frequent sequences in the 2 days leading up to fatal lightning events.

2-day sequence (day 1 to day 0)	*Occurrences before fatal day*
C to C (Cyclonic to Cyclonic)	3
C to S (Cyclonic to Southerly)	2
C to W (Cyclonic to Westerly)	2
A to C (Anticyclonic to Cyclonic)	2

materials such as thatch roofing that provided little protection from lightning strikes, while features such as open chimneys and fireplaces also increased vulnerability. Apart from walking and cycling, fishing was the only leisurely activity observed, represented by the 'By Water' category.

The interconnectedness of societal change and hazard vulnerability is once again highlighted in the sharp decline in fatalities from the middle of the twentieth century onwards, a common theme in numerous studies (Elsom, 2015, 2018; Holle, 2016). Such societal changes include advances in agricultural practices, reduction in the number of outdoor labourers, urbanisation, improved quality of infrastructure, forecasting and public awareness (Elsom, 2018). As had been observed in previous studies, the summer months proved to be the deadliest and were strongly associated with cyclonic weather conditions, highlighting the link between low-pressure systems and fatal lightning strikes (Elsom and Webb, 2014, 2017; Wilkinson and Neal, 2021; Hayward *et al*., 2022). In many cases, cyclonic conditions involve frontal systems, particularly cold fronts, which can produce strong uplift and deeper convection, increasing the likelihood of lightning-producing thunderstorms (van Delden, 2001).

The primary limitation of this research is centred around the reliance on newspapers as the main data source. The usefulness and importance of newspapers in research cannot be overstated. However, newspapers can be subject to underreporting, reporting bias and inconsistent terminology (Jobbová *et al*., 2024). It is possible that some fatal lightning events may have been missed entirely, especially in earlier periods when reporting was less reliable. To address these limitations, additional historical sources could be used. Potential sources include coroner reports, meteorological station data or insurance records. These sources could be used to validate the data accessed through newspapers while also potentially unlocking new data not reflected in newspapers (Elsom, 2001; Elsom and Webb, 2014).

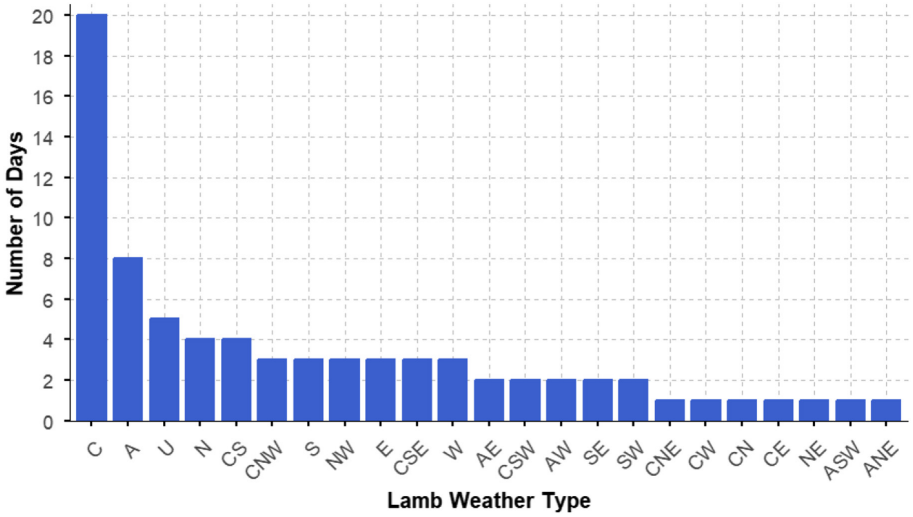

Figure 5. The number of fatal lightning strike days associated with each Lamb weather type (LWT) in Ireland since 1900.

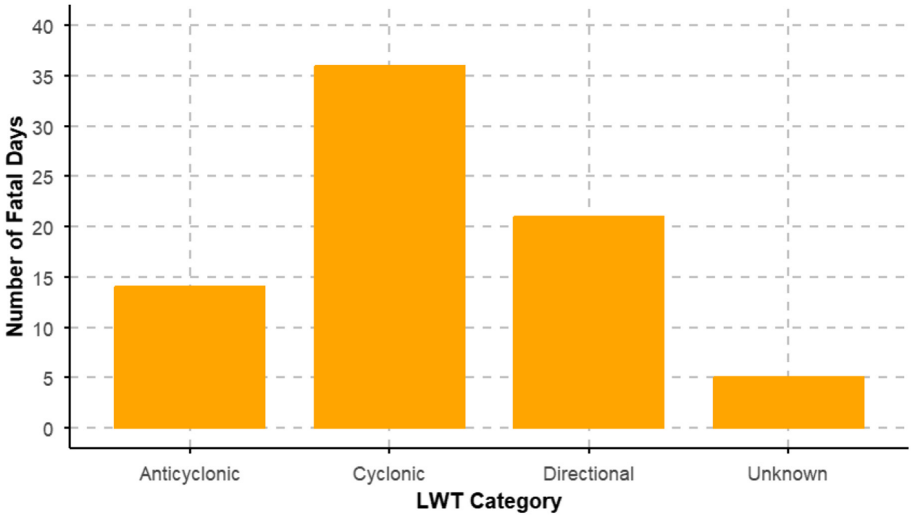

Figure 6. Lightning fatalities divided into four broad LWT categories: anticyclonic, cyclonic, directional and unknown.

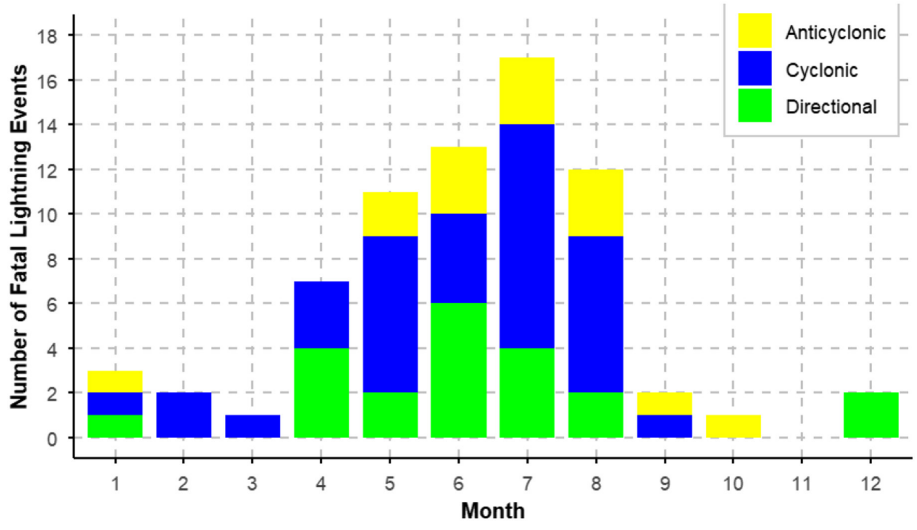

Figure 7. Distribution of broad LWT associated with fatal lightning events by month. Anticyclonic fatal lightning events are represented in yellow, cyclonic in blue and directional in green.

Future research could expand on the already collected data to include not just fatalities but other adverse lightning impacts also. Such a database would include information on lightning strikes which caused injuries to people, injuries and fatalities to animals and damage to infrastructure. This could be achieved through the use of the Irish Newspaper Archive. Key words and phrases such as 'struck by lightning', 'injured by lightning', 'maimed by lightning', among others could be used to identify pertinent articles. Other databases such as insurance records could also be used. Similar research has already been conducted by the Tornado and Storm Research Organisation (TORRO) which established a national database for UK lightning incidents (Elsom, 2001). Such a dataset would give a clearer indication of how hazardous lightning is for society in general, not just in fatal situations.

While fatal lightning strikes have become rare in Ireland, it remains important to understand the implications for lightning in a changing climate. The importance of understanding how lightning may change is particularly relevant when the observed increases in outdoor recreation during and since the COVID-19 pandemic are considered (Power *et al*., 2021). Among the limited number of studies addressing the future of lightning in a warming climate, there is a considerable lack of consensus among experts. Pinto (2013) hypothesises that as there will be more powerful thunderstorms, there will be increased lightning activity. Romps *et al*. (2014) are in agreement with this projection. Yair (2018) cautions against over-generalising the relationship between a warming climate and increased thunderstorm intensity. It is explained that changes in global circulation patterns, driven by climate change, could shift the geographical distribution and frequency of thunderstorms (Yair, 2018). Rather than predicting the future rate of lightning through indirect drivers such as temperature or storm intensity, Finney *et al*. (2018), concentrate on a physical process which is associated with lightning formation, the vertical movement of ice particles within clouds. Through this analysis, it was projected that there would be a 15% decrease in global lightning activity by 2100 (Finney *et al*., 2018). The various arguments reflect the complexity and difficulty of predicting lightning trends in a changing climate.

Conclusion

This study presented and analysed a chronology of fatal lightning strikes in Ireland from 1900 to 2024. Our findings show that lightning posed a significant threat to Irish society during the twentieth century. A total of 113 lightning fatalities are identified in Ireland since 1900. While fatal lightning strikes were far more prevalent during the early decades of the twentieth century, they have become a rarity over the last number of decades. This decrease is just as much a reflection of change in Irish society as it is of advances in meteorological science. The analysis of the data assembled in the chronology of fatal lightning strikes in Ireland since 1900 reveals that fatalities are most prevalent during the summer months, with strong links to cyclonic weather and, while there is a wide geographic distribution, fatalities are concentrated in the south and west of Ireland. This study offers the first chronology of such events in Ireland, providing both historical context and a platform for future research.

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Author contributions

RM and CM conceived the study, RM collected and analysed data, RF provided data on weather types, RM and CM wrote the manuscript, all authors provided edits and revisions.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

References

Antonescu B, **Cărbunaru F**. 2018. Lightning-related fatalities in Romania from 1999 to 2015. *Weather Clim. Soc.* **10**(2): 241–252. https://doi.org/10.1175/wcas-d-17-0091.1

Bates BC, **Chandler RE**, **Dowdy AJ**. 2015. Estimating trends and seasonality in Australian monthly lightning flash counts. *J. Geophys. Res. Atmos.* **120**(9): 3973–3983. https://doi.org/10.1002/2014jd023011

Bingert R, **Bremer L**, **Büttner A** *et al*. 2024. A 15-year review of lightning deaths in Germany – with a focus on pathognomonic findings. *Int. J. Legal Med.* **138**(4): 1343–1349. https://doi.org/10.1007/s00414-024-03175-6

Cardoso I, **Pinto O**, **Pinto IRCA** *et al*. 2014. Lightning casualty demographics in Brazil and their implications for safety rules. *Atmos. Res.* **135–136**: 374–379. https://doi.org/10.1016/j.atmosres.2012.12.006

Central Statistics Office. 2024. Key Findings Farm Structure Survey 2023. Dublin, Ireland: Central Statistics Office. https://www.cso.ie/en/releasesandpublications/ep/p-fss/farmstructuresurvey2023/keyfindings/ (accessed June 30 2025).

Coates L, **Blong R**, **Siciliano F**. 1993. Lightning fatalities in Australia, 1824–1991. *Nat. Hazards* **8**(3): 217–233. https://doi.org/10.1007/bf00690909

Compo GP, **Whitaker JS**, **Sardeshmukh PD** *et al*. 2011. The twentieth century reanalysis project. *Q. J. R. Meteorol. Soc.* **137**(654): 1–28. https://doi.org/10.1002/qj.776

Cooper MA, **Andrews CJ**, **Holle RR** *et al*. 2017. Lightning-related injuries and safety. *Auerbach's Wilderness Med.* **7**: 71–117. https://www.researchgate.net/profile/Mary-Ann-Cooper/publication/309487275_Lightning_injuries/links/5852c7ec08ae0c0f32227316/Lightning-injuries.pdf (accessed June 28 2025).

Curran B, **Holle R**, **Lopez R**. 2000. Lightning casualties and damages in the United States from 1959 to 1994. *J. Clim.* **13**(19): 3449–3464. https://doi.org/10.1175/1520-0442(2000)013<3448:LCADIT>2.0.CO;2

Dewan A, **Hossain MF**, **Rahman MM** *et al*. 2017. Recent lightning-related fatalities and injuries in Bangladesh. *Weather Clim. Soc.* **9**(3): 575–589. https://doi.org/10.1175/wcas-d-16-0128.1

Dwyer JR, **Uman MA**. 2014. The physics of lightning. *Phys. Rep.* **534**(4): 147–241. https://doi.org/10.1016/j.physrep.2013.09.004

Elsom DM. 2001. Deaths and injuries caused by lightning in the United Kingdom: analyses of two databases. *Atmos. Res.* **56**(1–4): 325–334. https://doi.org/10.1016/s0169-8095(00)00083-1

Elsom DM, **Webb JDC**. 2014. Deaths and injuries from lightning in the UK, 1988-2012. *Weather* **69**(8): 221–226. https://doi.org/10.1002/wea.2254

Elsom DM. 2015. Striking reduction in the annual number of lightning fatalities in the United Kingdom since the 1850s. *Weather* **70**(9): 251–257. https://doi.org/10.1002/wea.2493

Elsom DM, **Webb JDC**. 2017. Lightning deaths in the UK: a 30-year analysis of the factors contributing to people being struck and killed. *Int. J. Meteorol.* **42**(401): 8–26. https://www.researchgate.net/publication/322251510_Lightning_deaths_in_the_UK_a_30-year_analysis_of_the_factors_contributing_to_people_being_struck_and_killed (accessed June 28 2025).

Elsom DM, **Webb JK**. 2016. Lightning Impacts in the United Kingdom and Ireland. Hoboken, NJ: John Wiley & Sons, Ltd eBooks, pp 195–207. https://doi.org/10.1002/9781118949986.ch10.

Elsom DM. 2018. Factors contributing to a long-term decrease in national lightning fatality rates: case study of the United Kingdom with wider implications. *Int. J. Disaster Risk Reduct.* **31**: 341–353. https://doi.org/10.1016/j.ijdrr.2018.06.001

Fealy R, **Mills G**. 2018. Deriving Lamb weather types suited to regional climate

studies: a case study on the synoptic origins of precipitation over Ireland. *Int. J. Climatol.* **38**(8): 3439–3448. https://doi.org/10.1002/joc.5495

Finney DL, **Doherty RM**, **Wild O** *et al*. 2018. A projected decrease in lightning under climate change. *Nat. Clim. Chang.* **8**(3): 210–213. https://doi.org/10.1038/s41558-018-0072-6

Hayward L, **Whitworth M**, **Pepin N** *et al*. 2022. A regional lightning climatology of the UK and Ireland and sensitivity to alternative detection networks. *Int. J. Climatol.* **42**(15): 7839–7862. https://doi.org/10.1002/joc.7680

Holle RL. 2016. A summary of recent national-scale lightning fatality studies. *Weather Clim. Soc.* **8**(1): 35–42. https://doi.org/10.1175/wcas-d-15-0032.1

Jeffers JM, **Gonzalez S**, **Pulido-Sanchez P**, **Harwood A**. 2023. Constructing a history of wildfires in Ireland using digitised newspaper archives – ResearchSPAce. *Bathspa.ac.uk*. https://researchspace.bathspa.ac.uk/id/eprint/15780 (accessed 29 June 2025).

Jobbová E, **Crampsie A**, **Murphy C** *et al*. 2024. The Irish drought impacts database: a 287-year database of drought impacts derived from newspaper archives. *Geosci. Data J.* **11**(4): 1007–1023. https://doi.org/10.1002/gdj3.272

Jones PD, **Hulme M**, **Briffa KR**. 1993. A comparison of Lamb circulation types with an objective classification scheme. *Int. J. Climatol.* **13**: 655–663. https://doi.org/10.1002/joc.3370130606

Khan MK, **Ferdous J**, **Islam M**. 2024. Epidemiology of lightning related deaths and injuries in Bangladesh in 2018. *Bangladesh Med. Res. Counc. Bull.* **50**(3): 135–140. https://doi.org/10.3329/bmrcb.v50i3.78144

Lopez R, **Holle R**. 1998. Changes in the number of lightning deaths in the United States during the twentieth century. *J. Clim.* **11**(8): 2070–2077. https://doi.org/10.1175/1520-0442(1998)011<2070:CITNOL>2.0.CO;2

McManus R. 2011. Suburban and urban housing in the twentieth century. *Proc. R. Ir. Acad. C. Archaeol. Celt. Stud. Hist. Linguist. Lit.* **111C**: 253–286. https://www.jstor.org/stable/41472822 (accessed July 2 2025).

Mishra M, **Acharyya T**, **Guria R** *et al*. 2024. Lightning-related fatalities in India (1967–2020): a detailed overview of patterns and trends. *Environ. Dev. Sustain* **28**: 7647–7676. https://doi.org/10.1007/s10668-024-05276-z

Morgenstern D, **Stucke I**, **Simon T** *et al*. 2022. Differentiating lightning in winter and summer with characteristics of the wind field and mass field. *Weather Clim. Dyn.* **3**(1): 361–375. https://doi.org/10.5194/wcd-3-361-2022

Pardo N, **Sainz-Villegas S**, **Calvo AI** *et al*. 2023. Connection between weather types and air pollution levels: a 19-year study in nine EMEP stations in Spain. *Int. J. Environ. Res. Public Health* **20**(4): 2977. https://doi.org/10.3390/ijerph20042977

Pinto O. 2013. Lightning and climate: a review, in 2013 International Symposium on Lightning Protection (XII SIPDA). New York, NY: IEEE, pp 402–404. https://doi.org/10.1109/sipda.2013.6729250.

Power D, **Lambe B**, **Murphy N**. 2021. Trends in recreational walking trail usage in Ireland during the COVID-19 pandemic: implications for practice. *J. Outdoor Recreat. Tour.* **41**: 100477. https://doi.org/10.1016/j.jort.2021.100477

Roeder WP, **Cummins BH**, **Cummins KL** *et al*. 2015. Lightning fatality risk map of the contiguous United States. *Nat. Hazards* **79**(3): 1681–1692. https://doi.org/10.1007/s11069-015-1920-6

Rohan PK 1975. The Climate of Ireland. Dublin Stationary Office, pp 48–56.

Romps DM, **Seeley JT**, **Vollaro D** *et al*. 2014. Projected increase in lightning strikes in the United States due to global warming. *Science* **346**(6211): 851–854. https://doi.org/10.1126/science.1259100

Sleiwah A, **Baker J**, **Gowers C** *et al*. 2018. Lightning injuries in Northern Ireland. *Ulster Med. J.* **87**(3): 168. https://pmc.ncbi.nlm.nih.gov/articles/PMC6169419/ (accessed 29 June 2025).

van Delden A. 2001. The synoptic setting of thunderstorms in western Europe. *Atmos. Res.* **56**(1–4): 89–110. https://doi.org/10.1016/s0169-8095(00)00092-2

Wilkinson JM, **Neal R**. 2021. Exploring relationships between weather patterns and observed lightning activity for Britain and Ireland. *Q. J. R. Meteorol. Soc.* **147**(738): 2772–2795. https://doi.org/10.1002/qj.4099

www.irishnewsarchive.com. n.d. Irish News Archives | Home. https://www.irishnewsarchive.com/ (accessed June 21 2025).

Yair Y. 2018. Lightning hazards to human societies in a changing climate. *Environ. Res. Lett.* **13**(12): 123002. https://doi.org/10.1088/1748-9326/aaea86

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