

THUNDERSTORM SURVEILLANCE REPORT IRELAND

2023



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TERMINOLOGY

To help you better understand the information in this report, here are the definitions for some of the most frequently used terms.

- **Thunder day:** Each day that lightning was detected in a given area.
- **Lightning density:** The best current representation of thunderstorm activity is lightning density, which is the number of cloud-to-ground (CG) lightning flashes per km² per year.
- **Lightning flash:** All current discharges and electrical impulses from a lightning event. A lightning flash can occur within the same cloud (IC), between a cloud and the ground (CG) or between two clouds (CC). A lightning flash can be composed of one stroke or many strokes, which are current discharges and electrical impulses.
- **Cloud-to-ground (CG) lightning flash:** Discharge of current of a certain intensity circulating between the cloud and the ground. Abbreviated to CG (Cloud-to-Ground).

To be able to compare this data with the data collected, METEORAGE counts the main current pulse circulating between the cloud and the ground, defined in this report by the term “Lightning cloud-to-ground (CG) lightning flash”.



ABOUT THE LIGHTNING REPORT

The lightning report is based on data provided by [METEORAGE](#)'s lightning detection network in Europe.

Our expertise draws on more than ten years of analysis, observation and data collected in Europe, and more broadly worldwide. We have over 35 years' expertise in Ireland.

The performance of our network has been validated scientifically and delivers the best possible results with:

- > 98% lightning flash detection,
- a median detection accuracy of 100 meters,
- > 95% distinction made between cloud-to-ground (CG) lightning flashes and intra-cloud lightning flashes.

The METEORAGE network consists of more than 100 lightning sensors, calculators and a processing system that manages the databases. Our lightning sensors are based on the Vaisala technology, currently considered one of the best in the world. Our network achieves levels of performance validated by numerous scientific studies and publications.

This 2023 report is based on the most comprehensive source of information in Ireland.

The data, densities, rankings and thunder days in this report are dated from 1 January 2023 to 31 December 2023.

The information we provide concerns cloud-to-ground (CG) lightning flashes and lightning density.

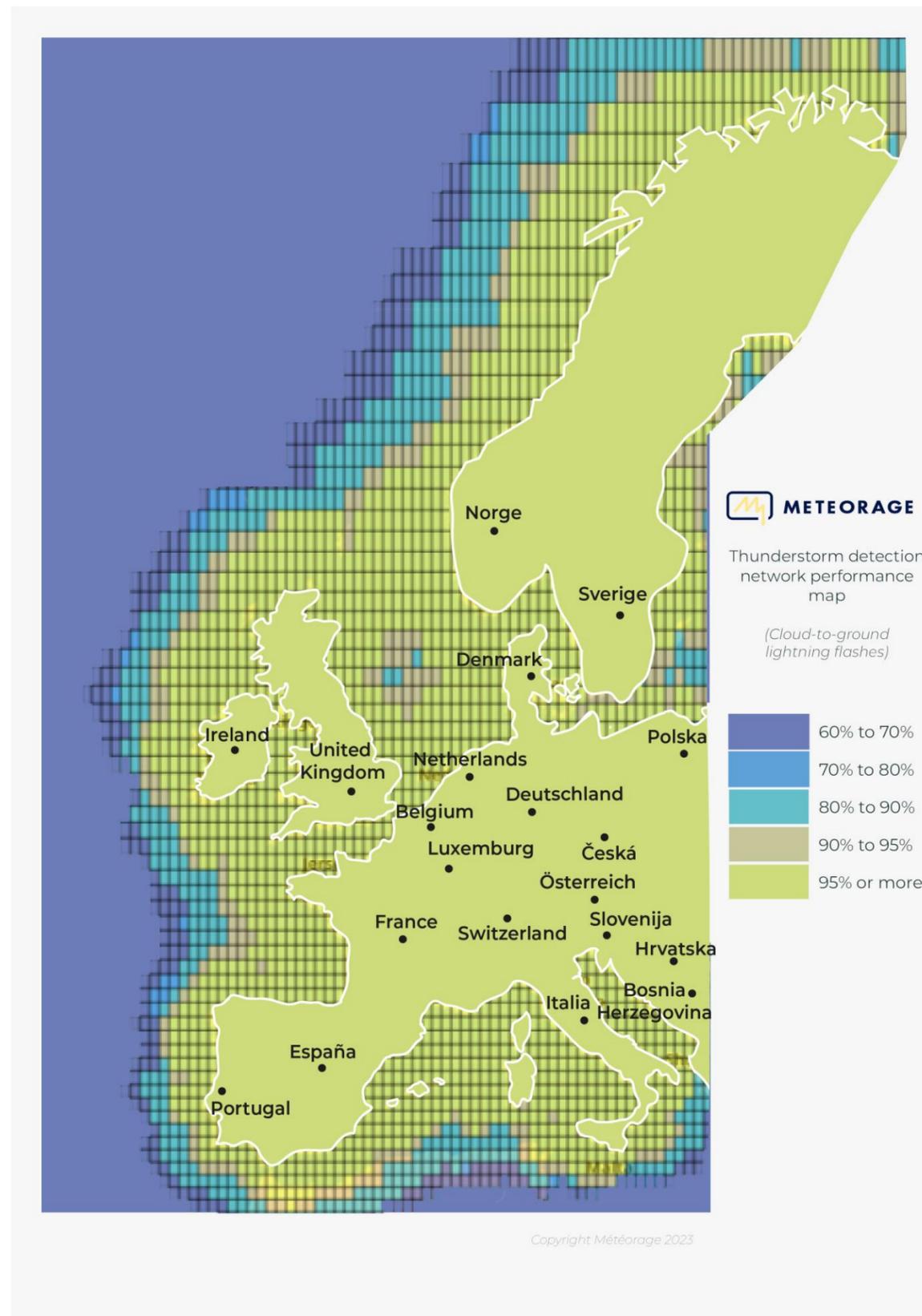


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- Xavier Delorme

ABOUT



Created in 1987, [METEORAGE](#), a subsidiary of Météo France (65% stake) and Vaisala (35% stake), is an innovative French company and member of French Tech, which operates the benchmark lightning detection network in Europe.

METEORAGE's mission is therefore to deliver information services, lightning risk prevention and decision-making services tailored to the issues faced by its users and applied to numerous sectors (industry, transportation, networks, leisure, tourism, meteorological services, aviation, defense, wind turbines, etc.). Outside Europe, METEORAGE provides the same services using the GLD network.

On the strength of its experience in network design and operation, and in generating decision-making services, METEORAGE also offers turnkey thunderstorm risk prevention system solutions for national meteorological services and large institutional users.

Its expertise enables it to respond to the major (human, environmental, material and economic) security issues of its customers and partners.

METEORAGE is **ISO 9001 certified** and **Qualifoudre** approved. In 2019, it was awarded the **OR'NORMES** Trophy by AFNOR in the category "Protecting people and/or the environment".

It is committed to CSR and its policy has been awarded the "Confirmed" level by AFNOR Certification—internationally recognized under the Responsibility Europe label. This represents an important recognition of the ethics and actions implemented daily by METEORAGE. Corporate social responsibility has been an integral part of its culture and organization for more than 35 years.

The driving purpose of METEORAGE, that of saving lives and protecting property by mitigating the risks generated by lightning, is part of its mission as a company serving the community with an ethical approach adopted by each of its employees, who are committed ambassadors.

*source: Cooper, M. A. & Holle, R. L. Reducing Lightning Injuries Worldwide. Springer Natural Hazards (2019)

Why does METEORAGE detect and study thunderstorms and lightning?

To know its enemies better!

Each year, storm phenomena and lightning are at the origin of millions of cases of electrical damage and more than 20,000 deaths on Earth.*

METEORAGE can use its knowledge to provide its customers and partners with expertise and solutions to prevent the risks affecting people and infrastructure, through alarm services, real-time monitoring of storm phenomena, post-thunderstorm studies, etc.

METEORAGE is also actively involved in raising public and media awareness of the risks and consequences of lightning and thunderstorms.

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The year 2023 was marked by two significant lightning records, registered by METEORAGE:

- **2023 is the most lightning-struck year** since METEORAGE records began. Ireland was struck by 9,577 cloud-to-ground (CG) lightning flashes in 2023,
- **June 2023 stands out as the most lightning-struck month** of June since records began and most lightning-struck month of the year.

In Ireland, **95 thunder days** were recorded in 2023, compared to 92 in 2022.

According to the expert

«Ireland was struck by more than 9,500 cloud-to-ground (CG) lightning flashes in 2023, making it the most lightning-struck year since METEORAGE records began.

The core storm activity occurred in June, with the METEORAGE network observing more than 7,500 CG lightning flashes, representing almost 80% of the annual storm activity.

With the exception of a few thunderstorms in July, September and January, the rest of the year was characterized by a low frequency of CG lightning flashes.

June 2023 stands out as the most lightning-struck month of June since records began. Numerous storm fronts hit the country, associated with significant electrical activity, especially in the middle of the month when instability peaked. Two storm episodes alone generated more than half of the year's electrical activity.

In summary, storm activity in Ireland was highly variable, peaking in June and decreasing significantly outside this period.»

Joris Royet, METEORAGE Meteorology Project Manager

SIGNIFICANT EVENTS 2023

**#1
2023**

2023 : THE MOST LIGHTNING-STRUCK YEAR

With nearly 9,500 cloud-to-ground (CG) lightning flashes and 95 thunder days in one year, 2023 was the 1st most lightning-struck year in Ireland since 2006, when our records began in this area, far ahead of 2020 (with 4,939 CG) and 2022 (4,671 CG).

JUNE 2023 : 1ST MOST LIGHTNING-STRUCK MONTH OBSERVED & MOST LIGHTNING-STRUCK MONTH IN 2023

With more than 7,526 cloud-to-ground (CG) lightning flashes and 14 thunder days, June 2023 was the 1st most lightning-struck month observed and the most lightning-struck month in 2023 in Ireland.

**JUNE
17
2023**

JUNE 17th: MOST LIGHTNING-STRUCK DAY

The most lightning-struck day in Ireland, with almost 2,454 cloud-to-ground (CG) lightning flashes detected. This single day represents one quarter of the annual lightning activity.

OFFALY : THE MOST LIGHTNING STRUCK COUNTRY

The Ireland's most lightning-struck country in 2023, with 962 cloud-to-ground (CG) lightning flashes and 21 thunder days. The highest electrical activity was recorded there on June 17th, 2023 with 398 cloud-to-ground lightning (CG) flashes.

DUBLIN

DUBLIN: THE MOST LIGHTNING-STRUCK TOWN

The capital is the most lightning-struck town in 2023, with a lightning density* of 0,0907. The highest electrical activity was recorded on May 8th, 2023, most lightning-struck day of the county since 2006.

**JUNE
2023**

OFFALY

*Lightning density: number of cloud-to-ground (CG) lightning flashes per km² per year.

SIGNIFICANT STORM PHENOMENA 2023

JUNE 13 & 17, 2023: ELECTRICALLY CHARGED DATES

June 2023 stood out as the most lightning-struck month of June since records began.

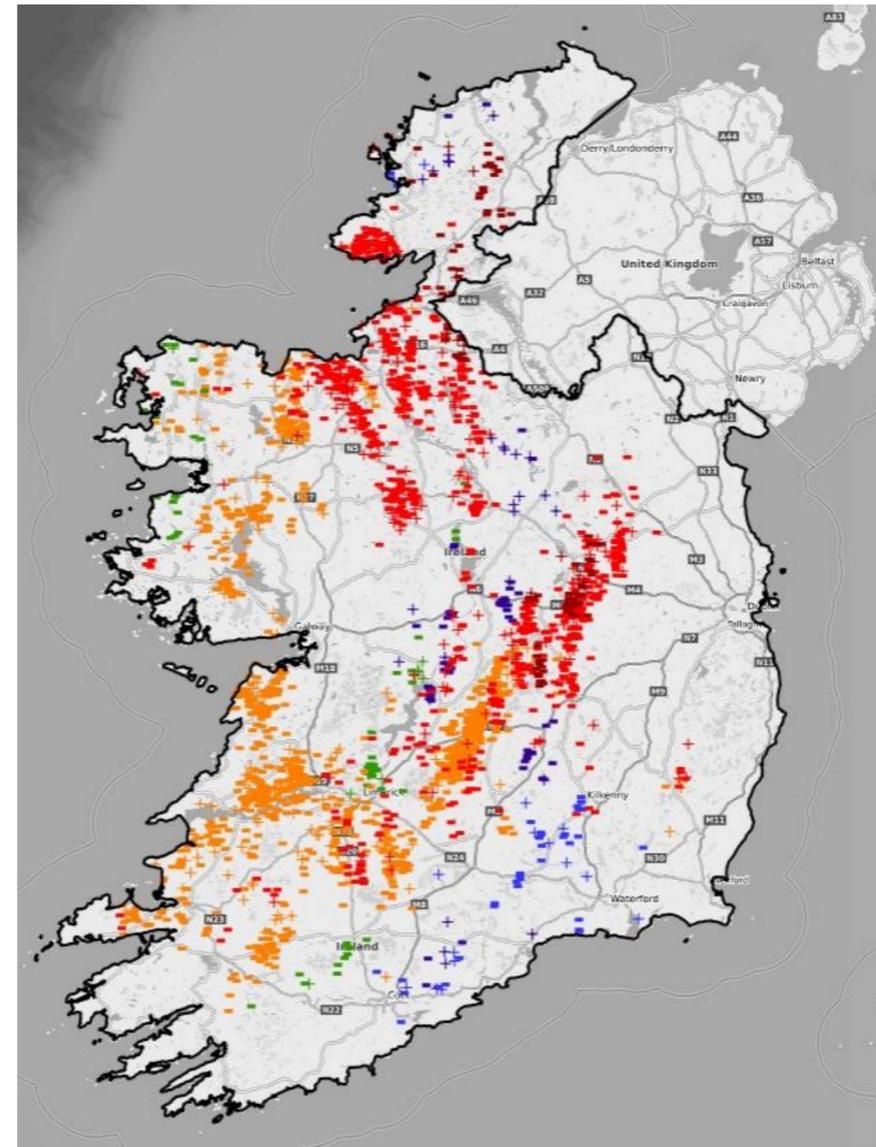
Two major storm episodes were recorded: the first on June 13, followed by the second on June 17.

A temporary period of high instability saw numerous thunderstorms break over western Europe, particularly in the west and south regions of Europe.

A first series of thunderstorms struck England on June 12, rolling westward the following day to hit Ireland head on. On June 13, more than 2,000 CG lightning flashes were detected by the METEORAGE network.

Saturday, June 17, 2023 remains the most electrically charged day of the year in Ireland, characterized by a succession of CG lightning flashes across the entire country (1/5 positive and 4/5 negative). Low-layer forcing, due to wind convergence, greatly contributed to the formation of storm cells between England and Ireland. METEORAGE's sensors detected more than 2,450 CG lightning flashes between 12:00 UTC and 18:00 UTC. This means that over a quarter of the electrical activity observed during the year occurred in just six hours.

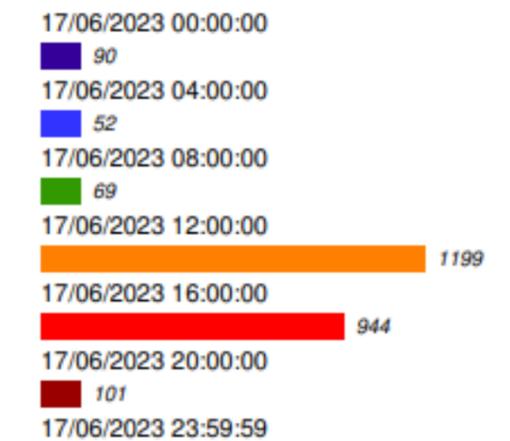
Lightning flash map
June 17th, 2023



Cloud-to-ground (CG) lightning flashes detected: 2,455

+ Positiv: 428
- Negativ: 2,027

Legend



Number of cloud-to-ground (CG) lightning flashes detected.
Per 4-hour period.

Copyright : METEORAGE

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TOP 10 MOST LIGHTNING-STRUCK COUNTIES IN 2023

Ranking by lightning density of cloud-to-ground (CG) lightning flashes per km²/year

1	OFFALY	0.4799
2	ROSCOMMON	0.2909
3	LIMERICK	0.2461
4	LEITRIM	0.2386
5	CLARE	0.2289
6	WESTMEATH	0.2179
7	TIPPERARY	0.2166
8	LONGFORD	0.2143
9	SLIGO	0.1842
10	CAVAN	0.1668

Ranking by number of cloud-to-ground (CG) lightning flashes

1	OFFALY	962
2	TIPPERARY	927
3	CLARE	789
4	ROSCOMMON	743
5	LIMERICK	683
6	GALWAY	681
7	DONEGAL	500
8	MAYO	464
9	CORK	401
10	WESTMEATH	399

TOP 10 MOST LIGHTNING-STRUCK CITIES/TOWNS IN 2023

Ranking by lightning density of cloud-to-ground (CG) lightning flashes per km²/year

1	KEENAGH	3.0915
2	BALLYGAR	2.8433
3	LIXNAW	2.7375
4	GRANGE	2.7354
5	ELPHIN	1.9050
6	KILLASHANDRA	1.8222
7	SHINRONE	1.6164
8	DAINGEAN	1.5837
9	ROCHFORTBRIDGE	1.5534
10	PORTLAW	1.4928

Ranking by number of cloud-to-ground (CG) lightning flashes

1	DUBLIN	31
2	ATHLONE	6
3	LIMERICK	6
4	ENNISCORTHY	4
5	BIRR	4
6	KILLARNEY	4
7	NENAGH	3
8	WATERFORD	3
9	LETTERKENNY	2
10	CARRICK-ON-SHANNON	2



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