Eclipses as natural experiments

A rare sky event. A surprisingly useful data collection.



Dattle reference diagram; labels summarize the cited source. Not an event photograph or measured time series. Credit: Dattle; original graphic from the cited reference.

Historical evidence. Better questions. Useful records.

These examples connect eclipse observations to weather, the solar corona and citizen science. The strongest record includes the conditions that could explain the result.

What the records reveal

SCOPE AND METHOD

Four historical examples from 2017-2024, described using NWS and NASA references. Participation totals and calibrated data counts measure different things and are not combined.

A COMPARISON WORTH MAKING

More pictures do not automatically mean more comparable data. Calibration, cloud conditions and timestamps determine which observations can be combined.

IMAGES AND UNCERTAINTY

Photographs and satellite views carry their original credits. Quantitative charts use cited values; conceptual diagrams are explicitly labeled and contain no invented measurements. AI assisted research and drafting; references were checked and limitations retained. A picture shows a place and moment; it does not prove an entire event boundary, impact or cause. This is a historical reference, not a live warning service.

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Charleston 2017: cooling with a complication

21 August 2017 | Charleston area, South Carolina



Dattle reference diagram; labels summarize the cited source. Not an event photograph or measured time series. Credit: Dattle; original graphic from the cited reference.

Event
Total solar eclipse

Weather observations
Temperature, wind and pressure

Additional influence
Thunderstorms

Observing method
Surface records and weather balloons

WHAT HAPPENED

NWS Charleston documented the eclipse with surface observations and weather-balloon launches. Temperatures fell, but thunderstorms also affected conditions during the event.

WHAT THE DATA REVEALS

A temperature trace needs a weather context. Record clouds and rain so eclipse-related cooling is not confused with cooling from a storm.

READ WITH CARE

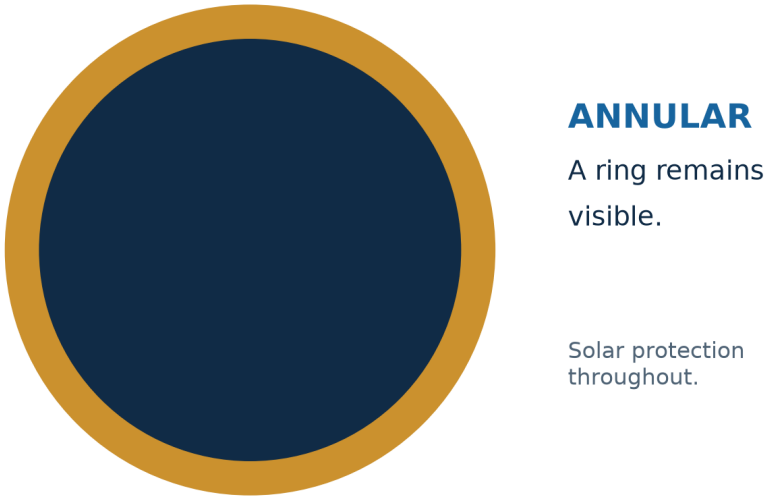
This case does not isolate a single causal temperature drop. It illustrates why a before-and-after comparison needs additional observations.

Source 1 >

Visual / data >

The 2023 annular eclipse: geometry matters

14 October 2023 | Annularity path across eight U.S. states



Dattle geometry diagram of an annular eclipse, not a photograph of the 2023 event. Not to scale. Credit: Dattle; original graphic from the cited reference.

Eclipse type
Annular

What remains visible
A ring of the Sun

Record
Exact site and phase

Safe viewing
Proper solar protection throughout

WHAT HAPPENED

The October 2023 eclipse was annular: the Moon did not cover the entire solar disk along the annularity path. Location therefore determines the view and the event timing.

WHAT THE DATA REVEALS

Record the site and the predicted contact times before comparing photographs. A partial view outside the path is not a failed observation.

READ WITH CARE

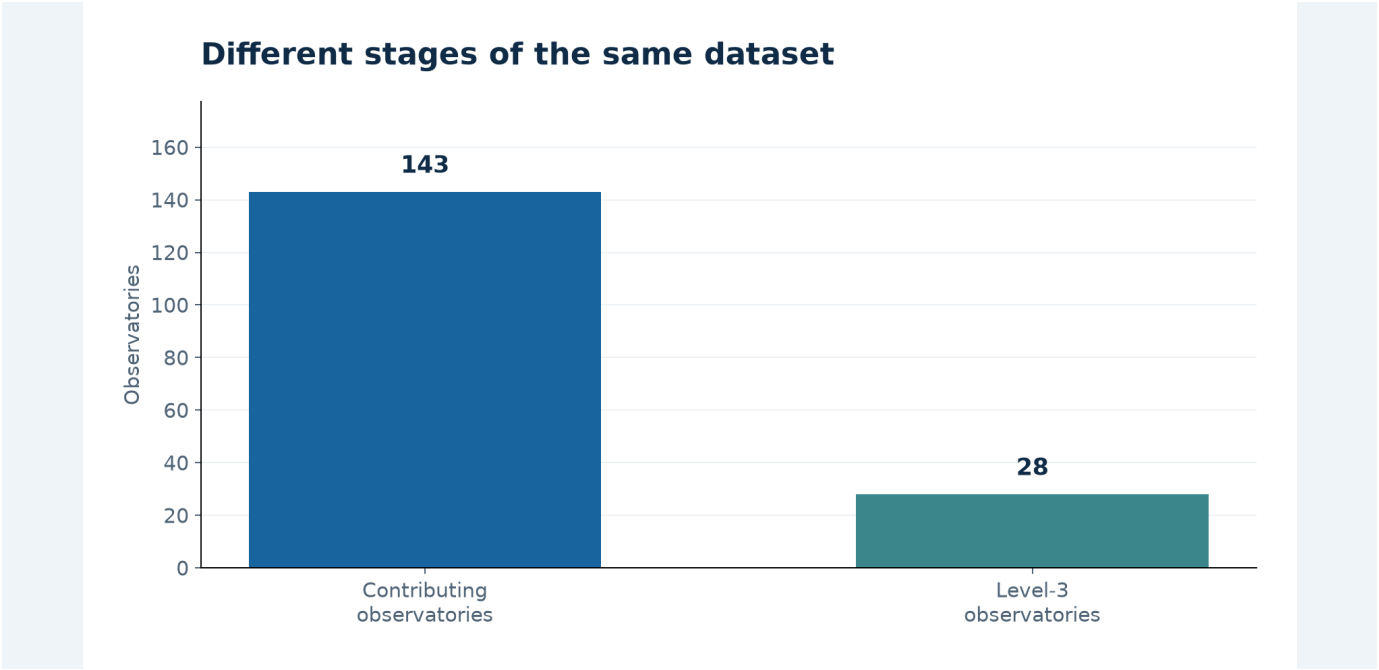
An annular eclipse has no safe unfiltered viewing phase. Follow NASA’s solar-viewing guidance; ordinary sunglasses are not solar filters.

Source 1 >

Visual / data >

Megamovie 2024: calibration earns its keep

8 April 2024; dataset described February 2026 | Volunteer observatories across the United States



NASA’s February 2026 dataset description. The level-3 group is a subset, not an additional group. Credit: Dattle; original graphic from the cited reference.

Contributing observatories **143**	Photographs submitted **52,469**
Level-3 observatories **28**	Calibrated format **FITS**

WHAT HAPPENED

NASA’s Eclipse Megamovie team released photographs from 143 mobile volunteer observatories. Twenty-eight supplied the clear skies, calibration frames and exposure coverage needed for level-3 imagery.

WHAT THE DATA REVEALS

Keep raw files and processing level together. That lets later work distinguish a visually striking image from one suitable for a calibrated comparison.

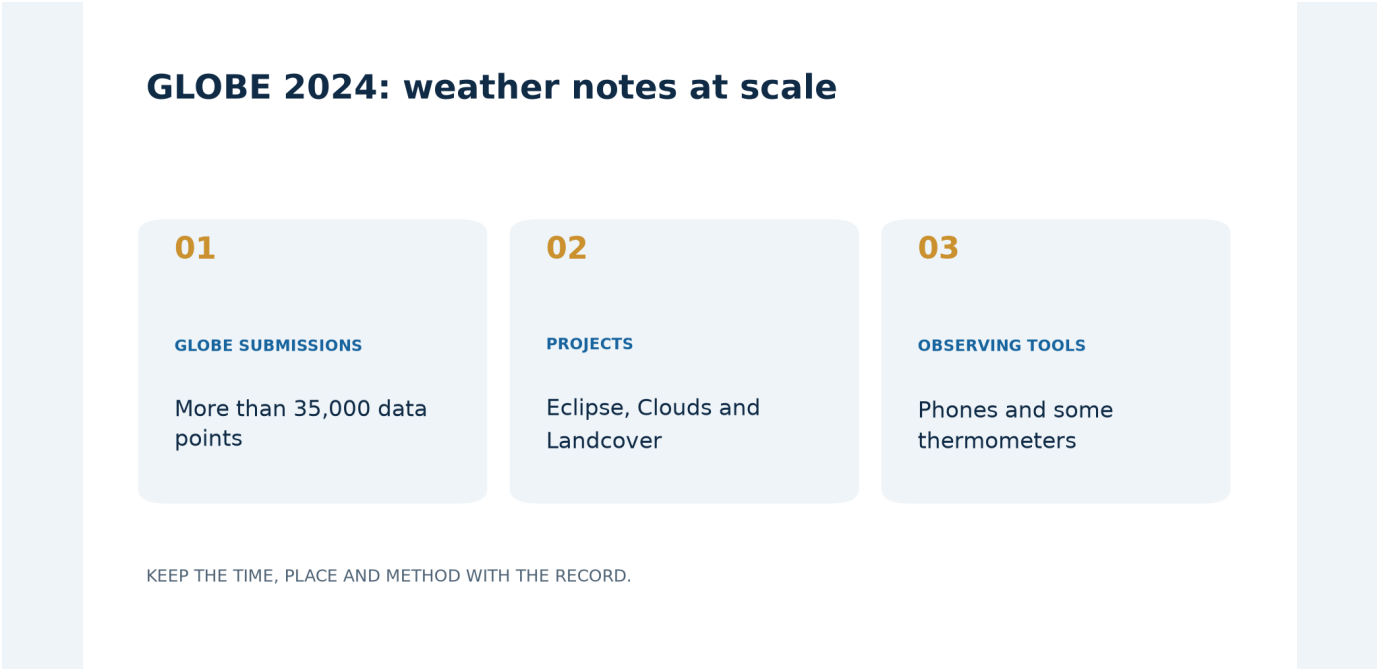
READ WITH CARE

The 28 observatories are a subset of 143, not a rejection rate for volunteers. Image count is not the number of independent scientific results.

Source 1 > **Visual / data >**

GLOBE 2024: weather notes at scale

8 April 2024; initial report 10 April 2024 | Eclipse observation sites



Dattle reference diagram; labels summarize the cited source. Not an event photograph or measured time series. Credit: Dattle; original graphic from the cited reference.

GLOBE submissions
More than 35,000 data points

Projects
Eclipse, Clouds and Landcover

Observing tools
Phones and some thermometers

Status at report date
Data still arriving

WHAT HAPPENED

NASA’s initial report described more than 35,000 submissions to GLOBE eclipse, cloud and land-cover projects. Participants recorded local conditions around the eclipse.

WHAT THE DATA REVEALS

A common field structure turns scattered observations into a dataset that can be checked and compared. Method and timing belong beside each value.

READ WITH CARE

The early submission total is not a count of validated findings. It should not be combined with later Megamovie totals or treated as an impact metric.

Source 1 > **Visual / data >**

From examples to observations

A USEFUL RECORD KEEPS ITS EVIDENCE

Keep the time, place, measurement method, unit, source and uncertainty with every observation. Separate what you saw from an estimate or interpretation. Repeat observations consistently, and retain the original evidence when updating a record.

SUGGESTED DATTLE FIELDS

- Site, coordinates and UTC timestamp
- Eclipse phase and contact-time source
- Air temperature, clouds and measurement method
- Camera exposure and calibration files
- Sound or wildlife observation and effort
- Source dataset/version; uncertainty

AI AS AN ACCELERATOR

Use this prompt to draft a collection structure, then review it. AI can organize the questions and fields; it cannot supply missing observations or replace source verification.

> Create a Dattle for eclipses as natural experiments. Include Site, coordinates and UTC timestamp, Eclipse phase and contact-time source, Air temperature, clouds and measurement method, Camera exposure and calibration files, Sound or wildlife observation and effort, Source dataset/version; uncertainty. Start with an empty collection. Separate observations, estimates and interpretations. Do not invent measurements, dates, locations or sources. Retain units, uncertainty and source links; flag missing information for review.

Explore Dattle at dattle.com. Availability, features and plan limits are described on the website.

Sources and image credits

Primary references checked November 12, 2026. Records and estimates can be revised. Every case page links to its evidence; full addresses are retained here for reuse.

01. Charleston 2017: cooling with a complication - primary reference
https://www.weather.gov/chs/eclipse

02. The 2023 annular eclipse: geometry matters - primary reference
https://science.nasa.gov/eclipses/future-eclipses/eclipse-2023/nasa-the-eclipse/

03. Megamovie 2024: calibration earns its keep - primary reference
https://science.nasa.gov/get-involved/citizen-science/new-volunteer-data-from-143-observatories-unveils-the-2024-total-solar-eclipse/

04. GLOBE 2024: weather notes at scale - primary reference
https://science.nasa.gov/get-involved/citizen-science/more-than-36000-volunteers-helped-do-nasa-eclipse-science/