

**EUMETSAT****NWC SAF**SUPPORT TO NOWCASTING AND
VERY SHORT RANGE FORECASTING

NWC SAF MTG-I1 Lightning Imager Products prototypes: overview, algorithms and its applications

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*NWC SAF MTG-I Lightning Imager Prototype
Products Workshop, 15 October 2026*



Lightning Imager (LI) general info

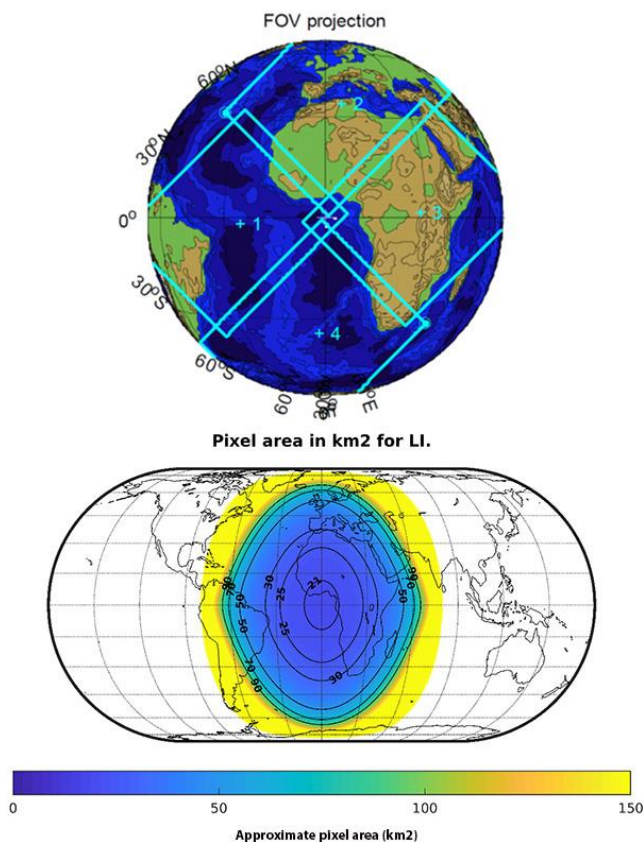
Level 2 LI Data

NWC SAF GEO-LI Software

NWC SAF GEO-LI Products Developed

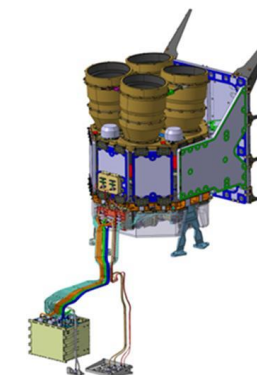
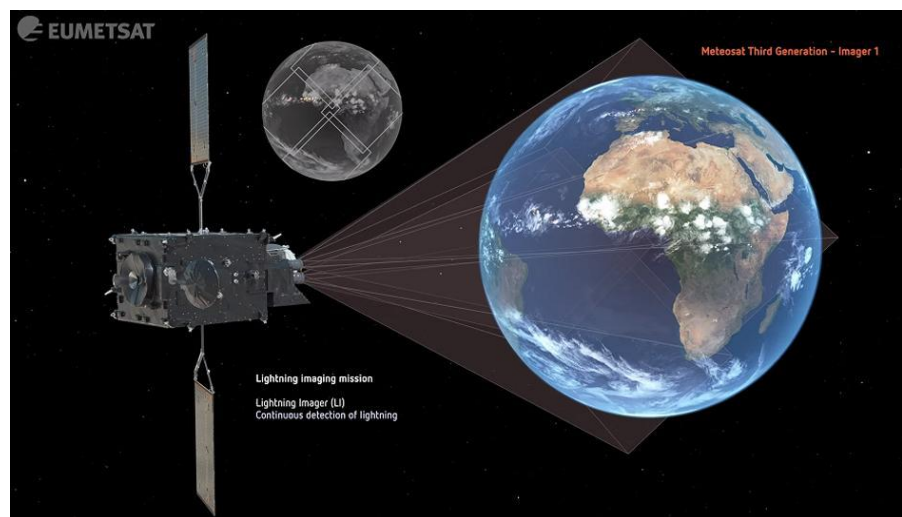
- *LiJump*
- *LiStack*

Conclusion and Future Aspects



Shows how each optical camera observes a different portion of the Earth disc: the required FOV coverage for the mission is 84% of the Earth disc observable from the 0° longitude geostationary position, and 100% of the territories of all the EUMETSAT member states.

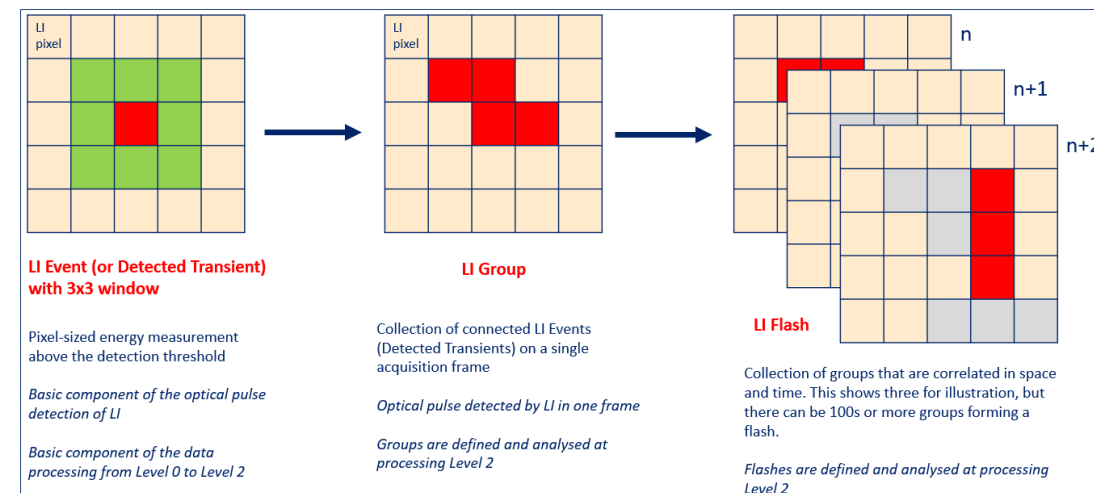
- ❑ is an imaging filter spectrometer with on-board data processing for detecting lightning by measuring the lightning optical pulse signal from the top of the atmosphere;
- ❑ The so-called LI Optical Head (LOH) includes four identical optical cameras (OC). Each OC is composed of a baffle for stray light, an optical system, a focal plane assembly with a 1000×1170 pixels CMOS detector and front-end electronics, including the real-time pixel processors for the on-board processing;
- ❑ Spectral band: narrowband filter centered over the neutral oxygen triplet at 777.4nm with 1.9nm bandwidth;
- ❑ Spatial sampling: the sampling at sub-satellite point is 4.5km, ie, smaller than typical dimensions of optical pulses expected from lightning activity, while over central Europe it is about 7 km.
- ❑ Temporal sampling: the integration time of 1ms period is comparable to the typical duration of pulses and twice the duration of the 'peak phase' (ie, about 0.5ms).



A 3D representation of the Lightning Imager Instrument.



- **Level 2 events (LEF)**, the finest scale over which LI can monitor lightning activity. Lightning Flashes and Lightning Groups contain two variables that provide the size of each group and flash in units of LI pixels, `number_of_events` and `flash_footprint`, respectively. To compute the exact physical size of a group/flash, users should use the information available in Lightning Events Filtered.
 - **LI Lightning Groups (LGR)** - (LI-2-LGR-x-FD-x) collections of pixel-based lightning events that are acquired within the same acquisition frame and are spatially clustered; product provides groups as points and are provided every 10s in netCDF format.
- Used as input data for LiJump product.**
- **LI Lightning Flashes (LFL)** - collections of groups that are correlated in space and time within the two windows of 330 milliseconds (temporal window) and 16.5km (space window), respectively; product provides flashes as points and are provided every 10s in netCDF format.



Schematic of processing steps of the LI level 2 initial products.
(Source EUMETSAT)



Used as input data for LiStack product.

❑ Accumulated Flash Area (AFA)

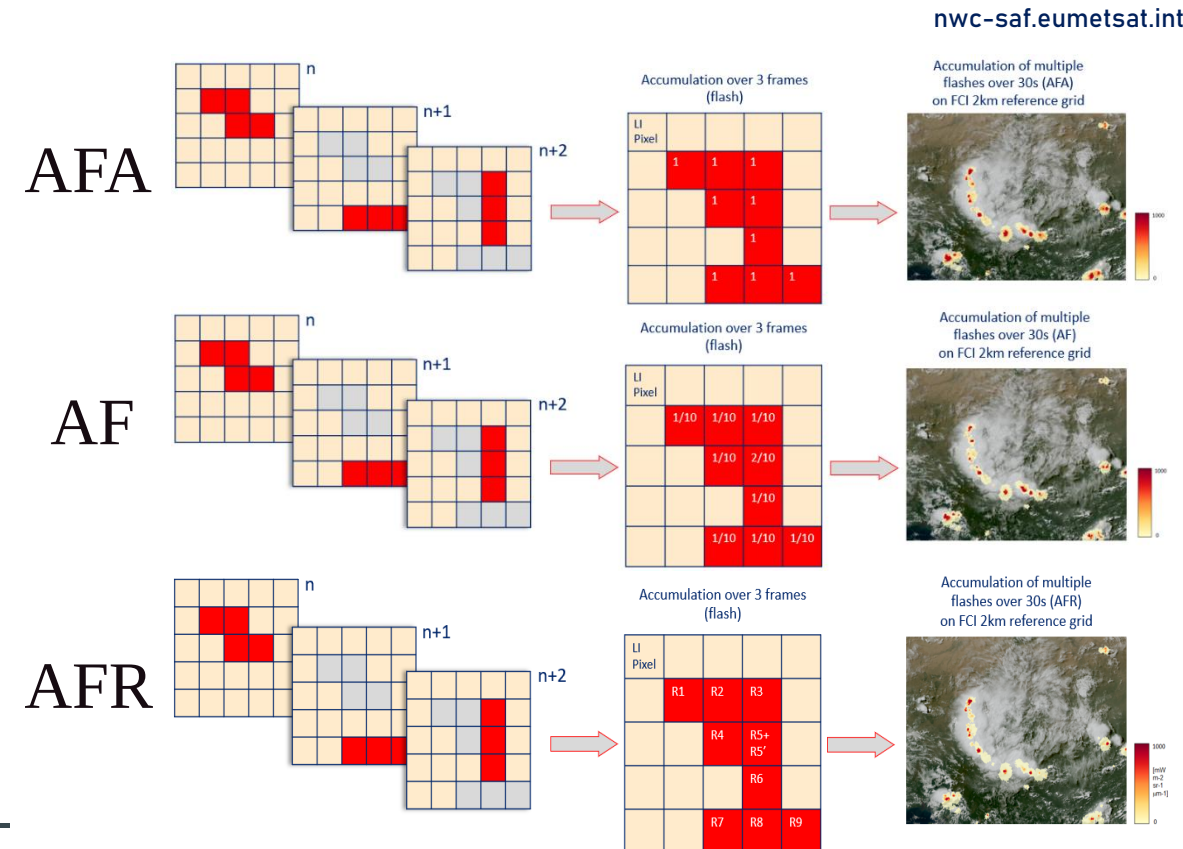
-provides information about the area covered by the optical emission of each lightning strike. Available at every 30s.

❑ Accumulated Flashes (AF)

-it complements AFA by providing information about the variation in the number of events in an area of interest where lightning activity has been observed. Available at every 30s.

❑ Accumulated Flash Radiance (AFR)

-it provides information about the pixel-by-pixel variation of accumulated optical emissions over a 30-second period. Available at every 30s.



Graphical representation of the accumulation of lightning events, contributing to AFA, AF, and AFR. On the left, we have different groups that make up the lightning event and its representative acquisition frame, where the gray shows the accumulated events up to the accumulation degree, and the red indicates the events added to the accumulation at each frame. On the right, we have the final result of the accumulation. (Source EUMETSAT)

- The GEO-LI package must deal with new satellite data having different spatial, temporal and spectral resolutions than the currently single supported FCI data.
- The new products, LiJump and LiStack, will be part of the new software package, GEO-LI.



- The LiJump is a future NWC SAF product, developed to detect small, short-duration discharges associated with the most rapid fluctuations in flash rate. It can help identify storms that may produce severe weather (including tornadoes, hail, and straight-line winds) in the short term. LiJump will use EUMETSAT L2 MTG-I LI lightning flashes (LFL) product to track storm “cells” directly from the LI observations and to detect rapid increases in lightning activity (“lightning jumps”).
- This new product only relies on LI data. Due to the faster refresh cycle of the LI data with respect to FCI, it is expected that the LiJump will provide a larger lead time to forecasters.
- The workflow is based on quality control and aggregation of flash observations into short, regular time intervals. At each time step, clustering is performed using the DBSCAN algorithm with predefined thresholds, designed to capture both intense storms and weaker storms that may be predisposed to becoming severe. Finally, the identified cells are linked through time to form continuous tracks, and cases exhibiting lightning-jump behavior are flagged.



class Thresholds:

Strong LJ thresholds (σ -LJ / FRarea-LJ / RIL-LJ)

- s_sigma: float = 2.0
- s_activation_fr: float = 20.0 - **minimum flash rate (FR) for strong LiJump**
- ril_threshold: float = 1.1 - **relative increase level threshold**
- ril_activation_fr: float = 20.0 - **minimum flash rate for relative increase level (RIL) LiJump**

Weak Lightning Jumps

- w_sigma: float = 1.0
- w_activation_fr: float = 10.0 - **minimum flash rate for weak LiJump**

Minimum lifetime / tracking constraints

- min_track_len: int = 4 - **minimum lifetime of a valid tracked cell**
- max_gap: int = 2 - **maximum allowed temporal gap in the storm track**

```
@dataclass
class Settings:
    # Geometry and filesystem paths.
    region_cfg: str = "EUR-MLAND.cfg"
    input_dir: str = "data"
    output_dir: str = "../output/LiJump"
    px_dir: str = "aux"

    # Processing windows.
    history_minutes: int = 40
    display_minutes: int = 10

    # Flash clustering and cell tracking.
    min_flashes: int = 5
    dbscan_eps_km: float = 20.0
    dbscan_min_samples: int = 3
    track_search_km: float = 40.0
    min_track_len: int = 4
    max_gap_minutes: int = 2
    bin_minutes: int = 2

    # Sigma and RIL detectors.
    sigma_history_minutes: int = 12
    sigma_min_samples: int = 6
    sigma_floor: float = 0.000001
    strong_sigma: float = 2.0
    strong_activation_fr: float = 20.0
    weak_sigma: float = 1.0
    weak_activation_fr: float = 10.0
    ril_threshold: float = 1.1
    ril_activation_fr: float = 20.0
    ril_window_minutes: int = 5
    ril_baseline_minutes: int = 12
    ril_min_samples: int = 6

    # Optional parallax correction.
    apply_parallax: bool = True
    px_mode: str = "adaptive"
    px_idw_distance_floor_km: float = 0.25
    px_k_neighbors: int = 4
    px_max_match_km: float = 30.0
    px_month_anchor_day: int = 15
    px_ice_bias: float = 1.5
    px_sigma_floor_m: float = 500.0
    px_min_ice_cth_m: float = 6000.0
    px_min_ice_weight: float = 0.70
    px_hard_shift_cap_km: float = 100.0
```



- A verification over Romanian territory had been made, having all the data available for the LINET. For the first verification we started with the 2025 convective season analyzed over Romania territory, May 2025 was the most active hail month (92 locality reports), followed by July (77 reports) and August (62 reports), while June showed fewer cases (35 reports) but included one of the most extreme events of the season (8 cm hail at Leghin, Neamt). Were selected 35 case studies for the verification in order to cover up all types of hails diameters.
- The data that had been proceeds as the input for the LiJump algorithm, of over 3000 files per month for Lightning flashes (LFL) available on Data Store at every 10 minutes. Need to be mentioned that it is not an accumulation and is the total of all the events happened over a specific time slot.
- The parallax correction for this product can be applied using a climatology-driven parallax engine monthly NetCDF look-up tables (LUTs) (e.g., PX_May_2005_2018_MK_res1.nc) and improves it with time interpolation, multi-neighbour weighting, and an ice-cloud preference.
- It was observed a matching of LiJump results and LINET over 85% .

Figure 2. Chronological variation of LINET lightning activity in the Gorj main cluster ROI
5-minute stroke counts | ROI: 22.75–23.60°E, 44.65–45.35°N | 2025-07-27 00:00 UTC to 2025-07-28 00:00 UTC

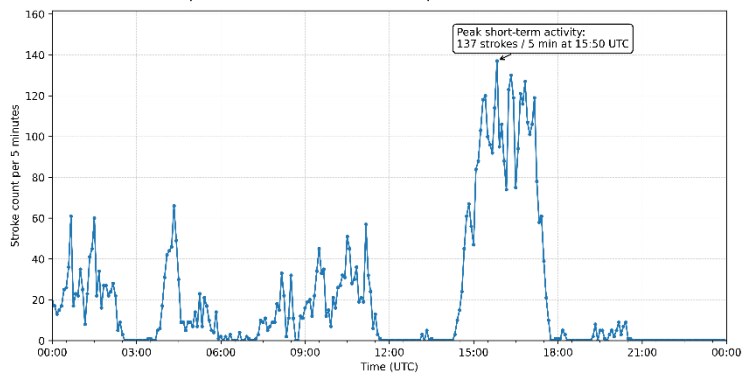


Figure 2. Chronological variation of LINET lightning activity in the Oltenia-Gorj-Dolj ROI
5-minute stroke counts | ROI: 22.55–23.70°E, 43.75–45.35°N | 2025-07-27 00:00 UTC to 2025-07-28 00:00 UTC

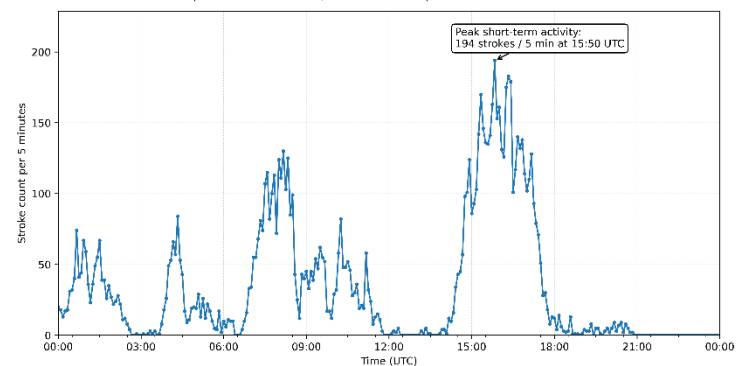


Figure 2. Chronological variation of LINET lightning activity in the Ludus-Mures ROI
5-minute stroke counts | ROI: 23.80–24.35°E, 46.25–46.75°N | 2025-07-27 00:00 UTC to 2025-07-28 00:00 UTC

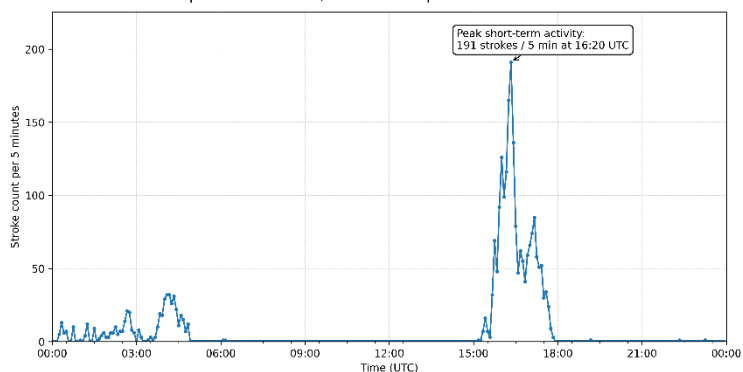


Figure 2. Chronological variation of LINET lightning activity in the Suceava-Călimani ROI
5-minute stroke counts | ROI: 24.95–26.95°E, 46.90–48.05°N | 2025-07-27 00:00 UTC to 2025-07-28 00:00 UTC

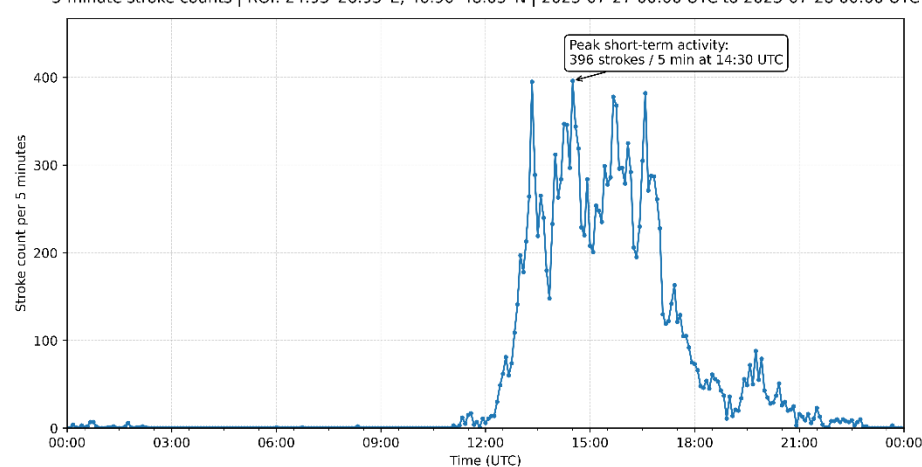


Figure 1. Spatial density of LINET lightning strokes within the Suceava-Călimani ROI
ROI: 24.95–26.95°E, 46.90–48.05°N | 2025-07-27 00:00 UTC to 2025-07-28 00:00 UTC

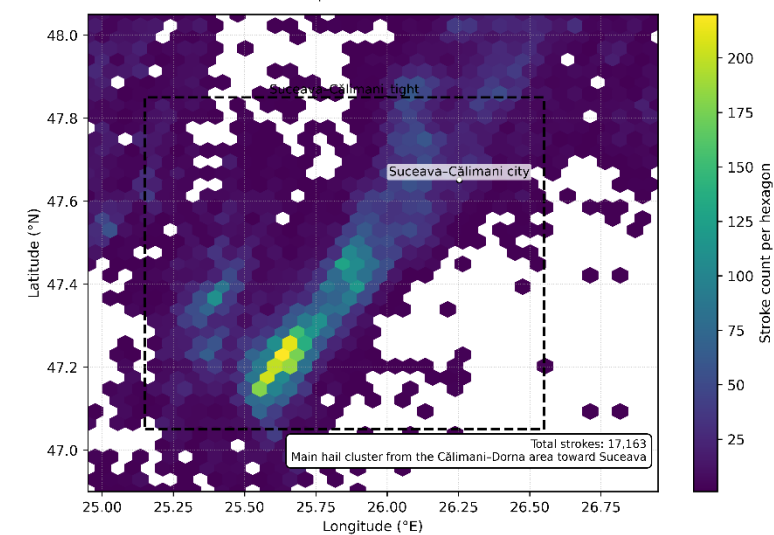
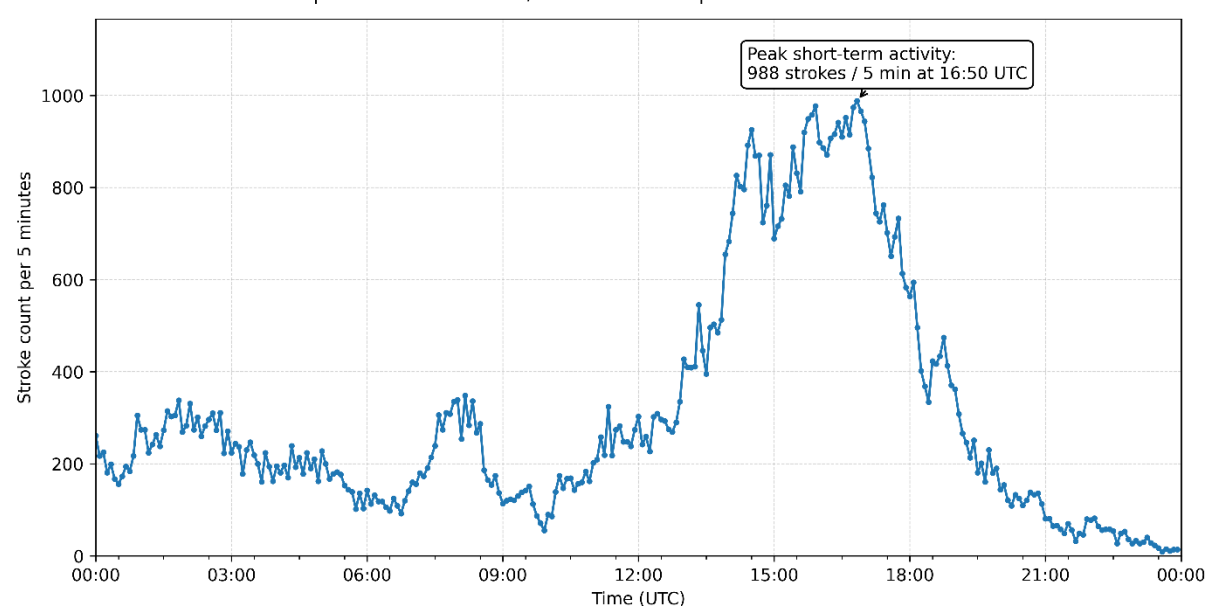
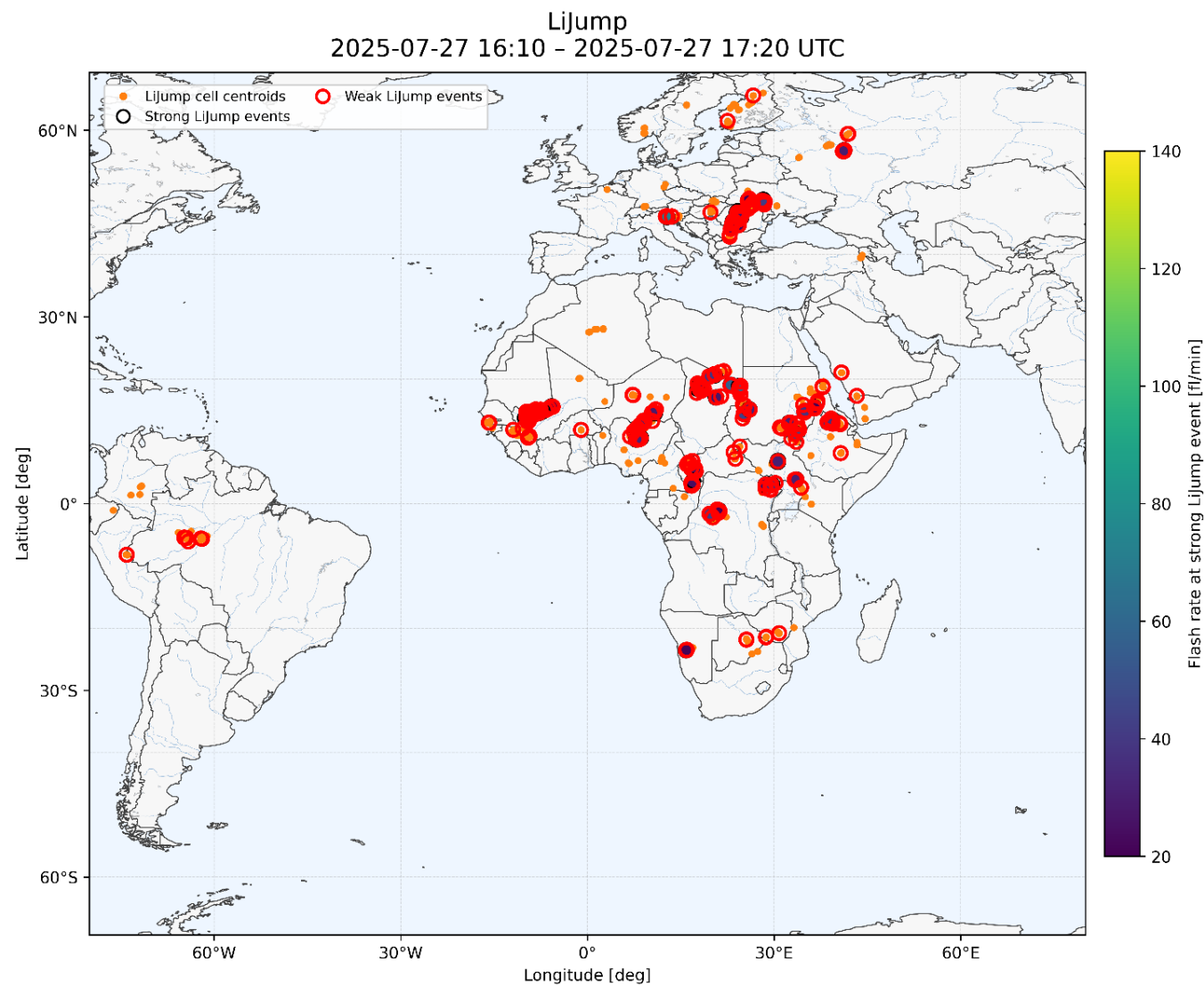
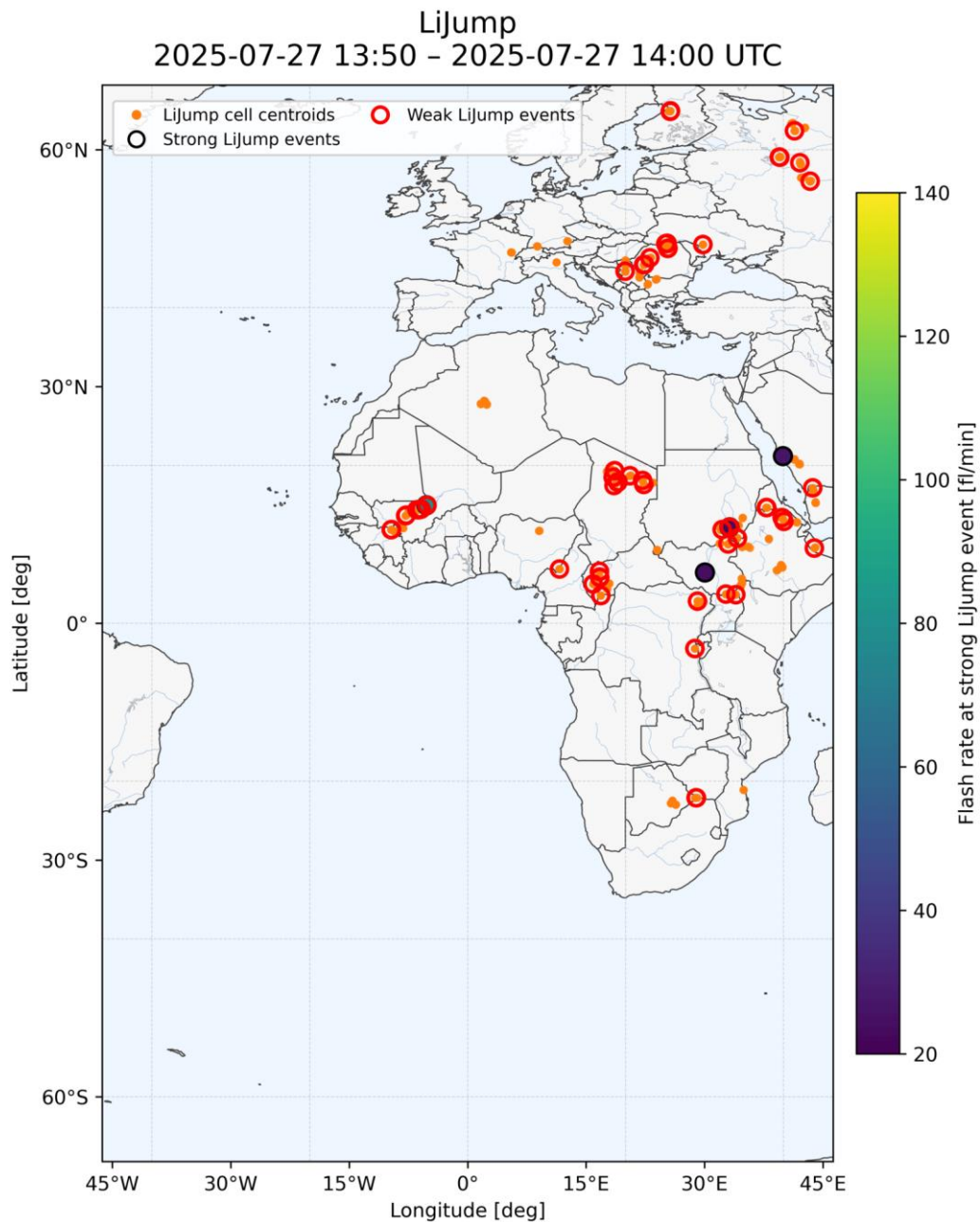


Figure 2. Chronological variation of LINET lightning activity in the Romania hail overview ROI
5-minute stroke counts | ROI: 19.00–31.00°E, 42.00–50.00°N | 2025-07-27 00:00 UTC to 2025-07-28 00:00 UTC







- Study case: July 27 represents a particularly intense situation with multiple 7-8 cm hail reports in Suceava County. August 22 was another extensive episode, affecting several counties with hail sizes reaching 7 cm (Brasov).
- What was observed:
 - Peak flash rates exceeded 80–110 flashes per minute in tracked cells, with pronounced positive dFR/dt values surpassing the dynamic sigma-based thresholds;
 - Strong LiJump flags were frequently observed 10-30 minutes prior to the peak hail reports.
 - The area-normalized flash-rate metric (FR/km^2) also showed abrupt increases during these periods, suggesting robust updraft intensification and vigorous mixed-phase microphysics. For example, during the 27 July 2025 Suceava outbreak (13:50-18:50 UTC), the LiJump algorithm identified multiple tracked cells exhibiting sustained high flash rates (more than 90 fl/min) and significant lightning jumps.



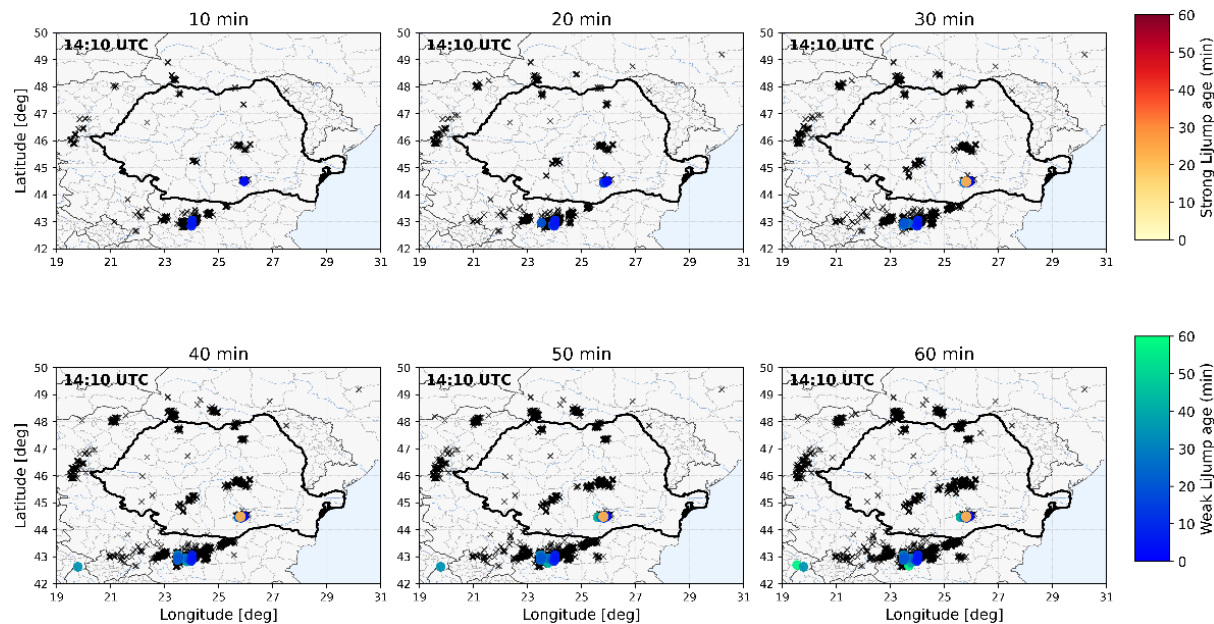
- examining cases associated predominantly with small hail (0.3-1.5 cm). Several study cases (e.g., 3 June 2025, 6 August 2025, and early September localized events) included reports of small hail (0.3-2.5 cm) without extensive severe impacts. In these events, LiJump signals were often weaker. Flash rates typically remained below 30-40 fl/min, and in some instances the dFR/dt escalation did not exceed the dynamic threshold required for a strong LiJump flag. Weak LJ or moderate RIL signals were sometimes present, but these were less consistent.
- improvement of the algorithm and implementation of a new threshold range for the weak LiJump (can be also called potentially into development strong LiJump) for the flash rate lower than the one for strong LiJump.



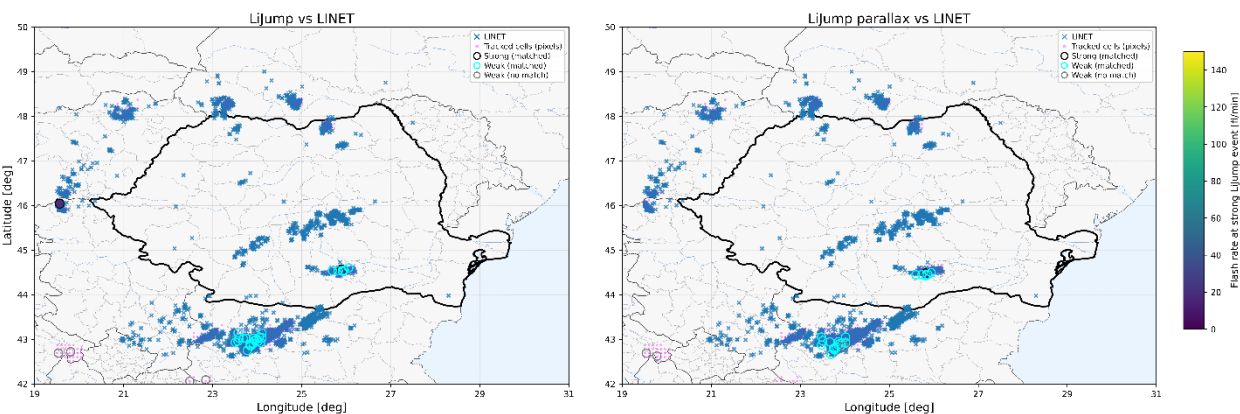
17 July 2025, Nowcasting Red Alarm over Bucharest

l.int

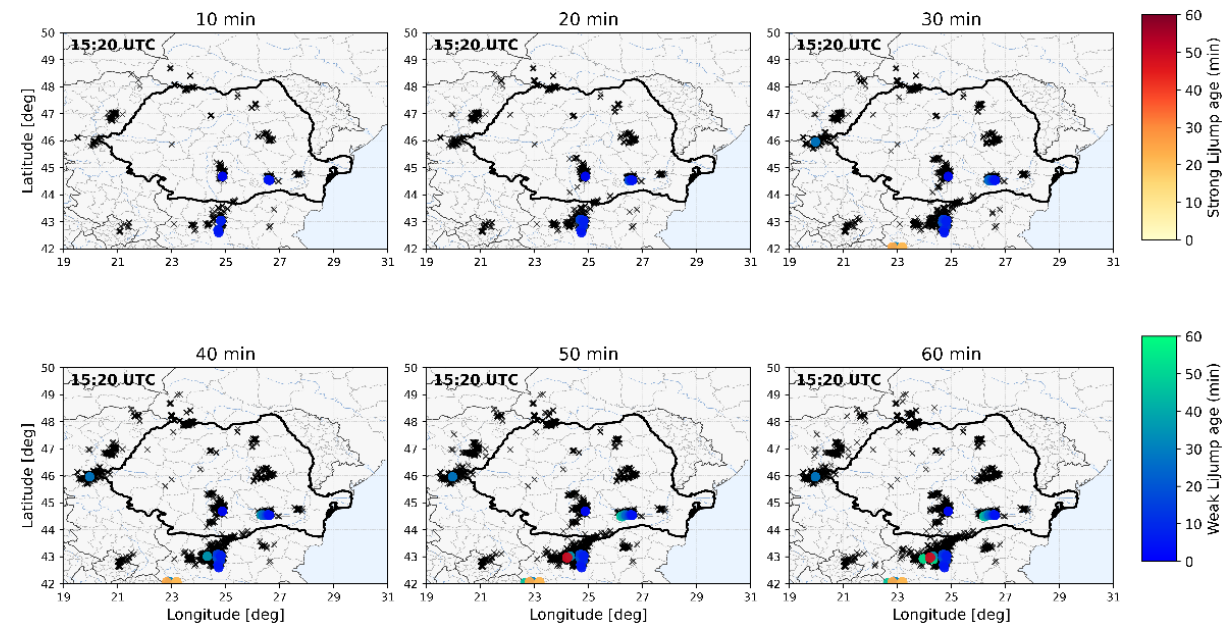
Lijump
base: 2025-07-17 14:10 UTC
× LINET



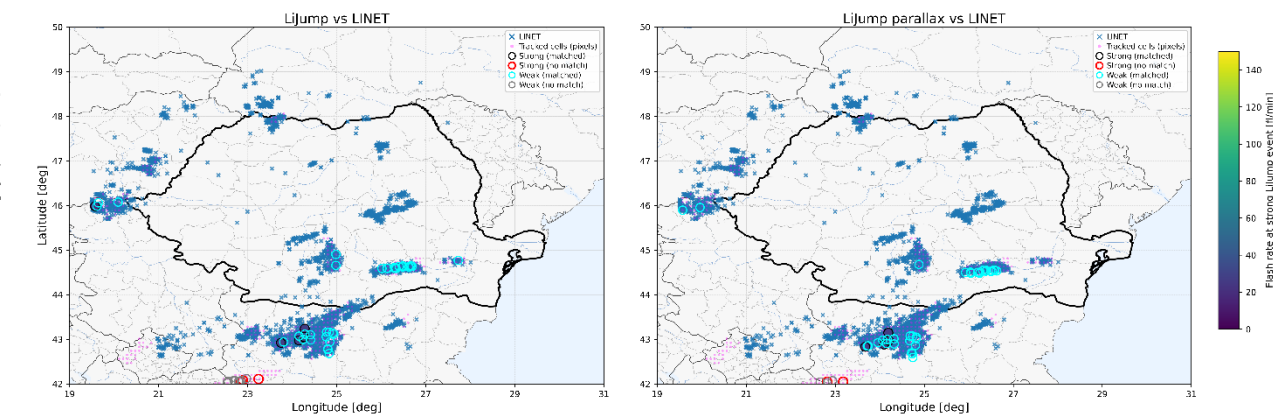
Lijump vs LINET | 2025-07-17 12:50 - 2025-07-17 14:10 UTC | parallax_applied_for_detection=1



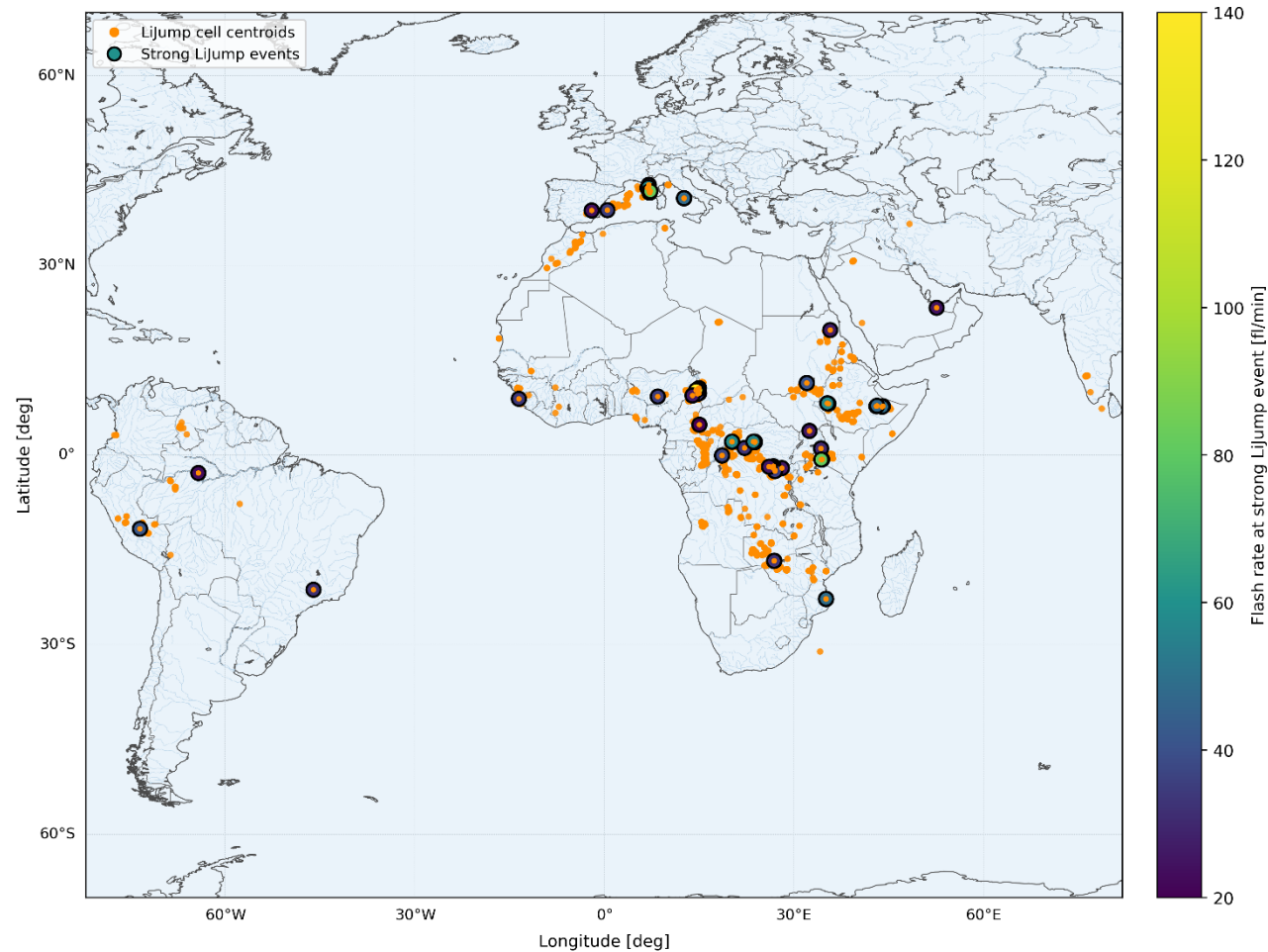
Lijump
base: 2025-07-17 15:20 UTC
× LINET



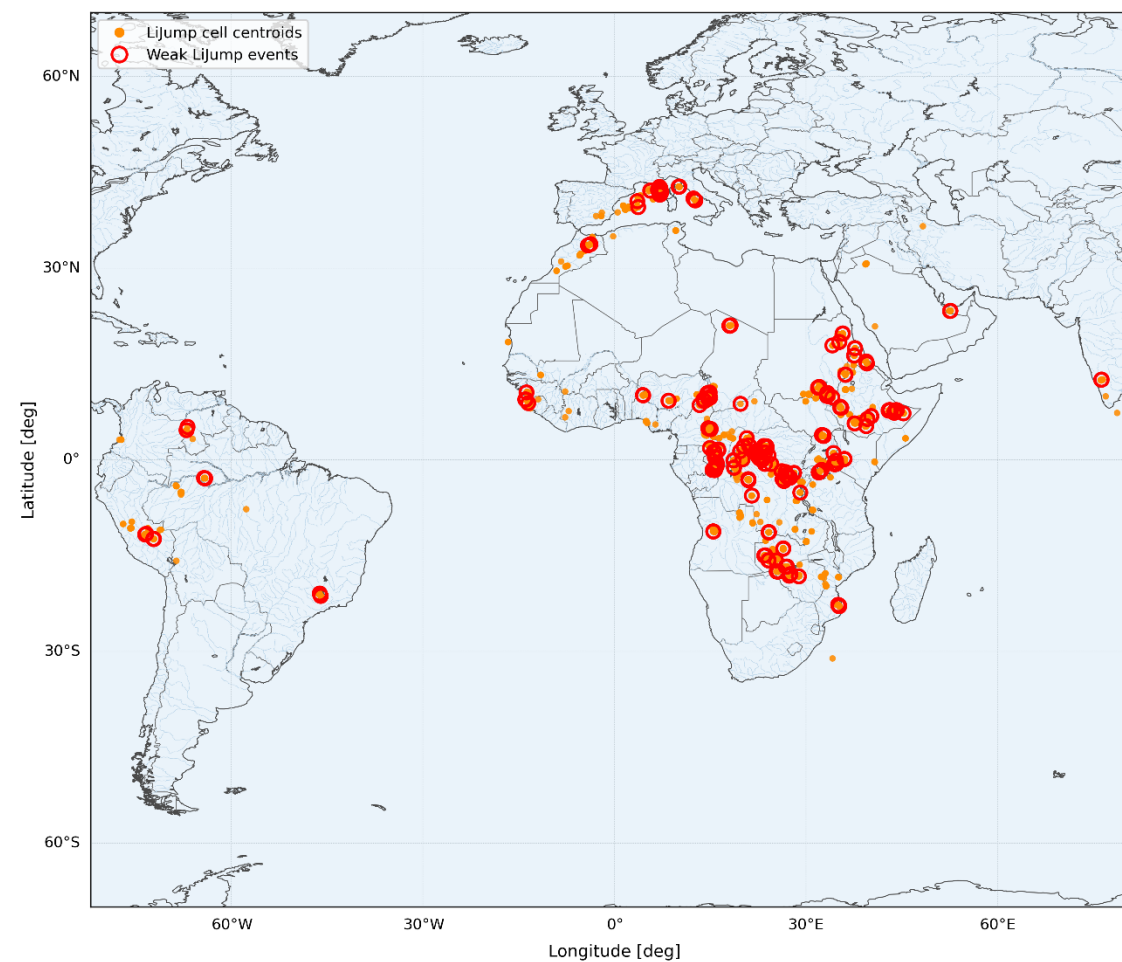
Lijump vs LINET | 2025-07-17 14:00 - 2025-07-17 15:20 UTC | parallax_applied_for_detection=1



Lijump — Strong layer
2026-10-07 02:19 - 2026-10-07 12:59 UTC

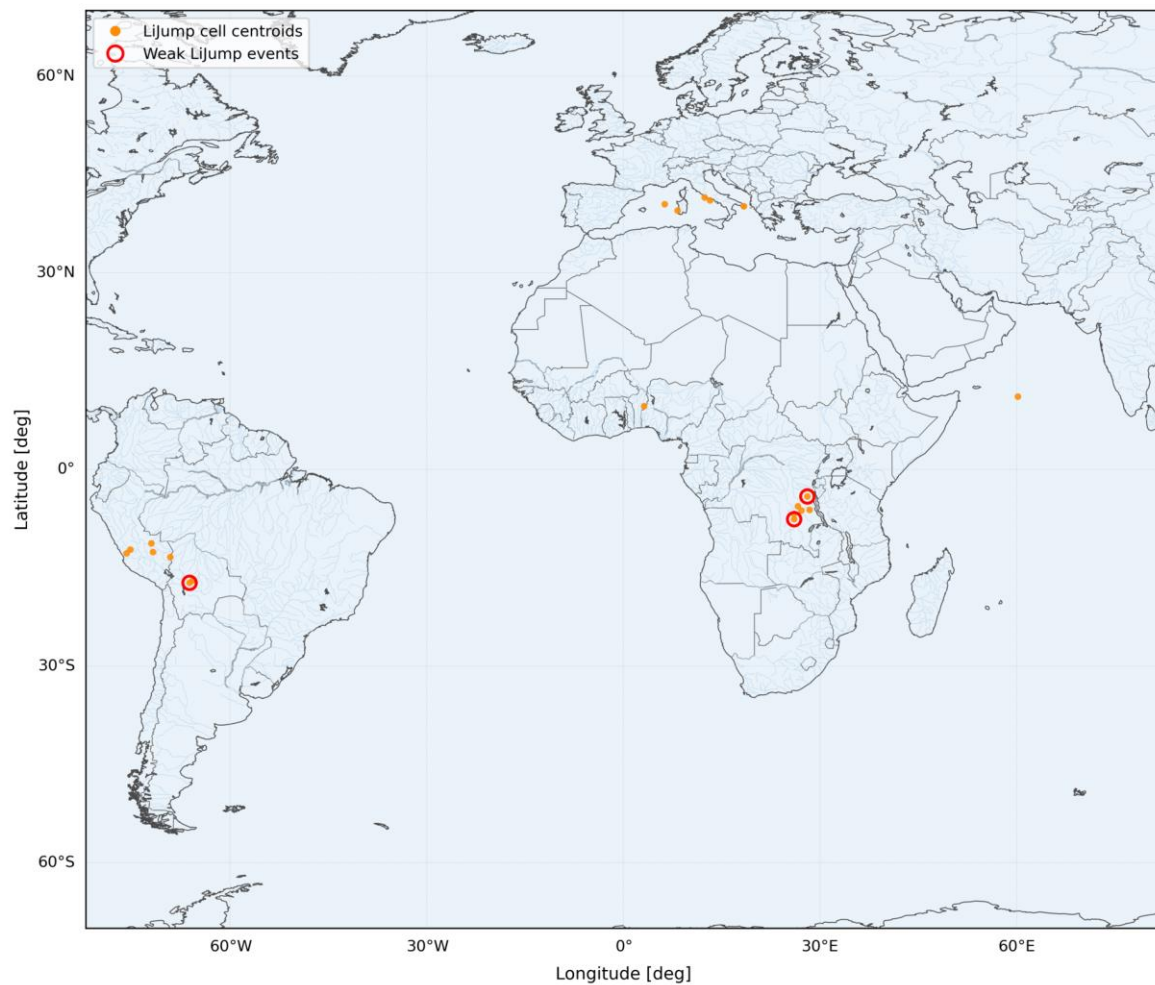


Lijump — Weak layer
2026-10-07 02:19 - 2026-10-07 12:59 UTC

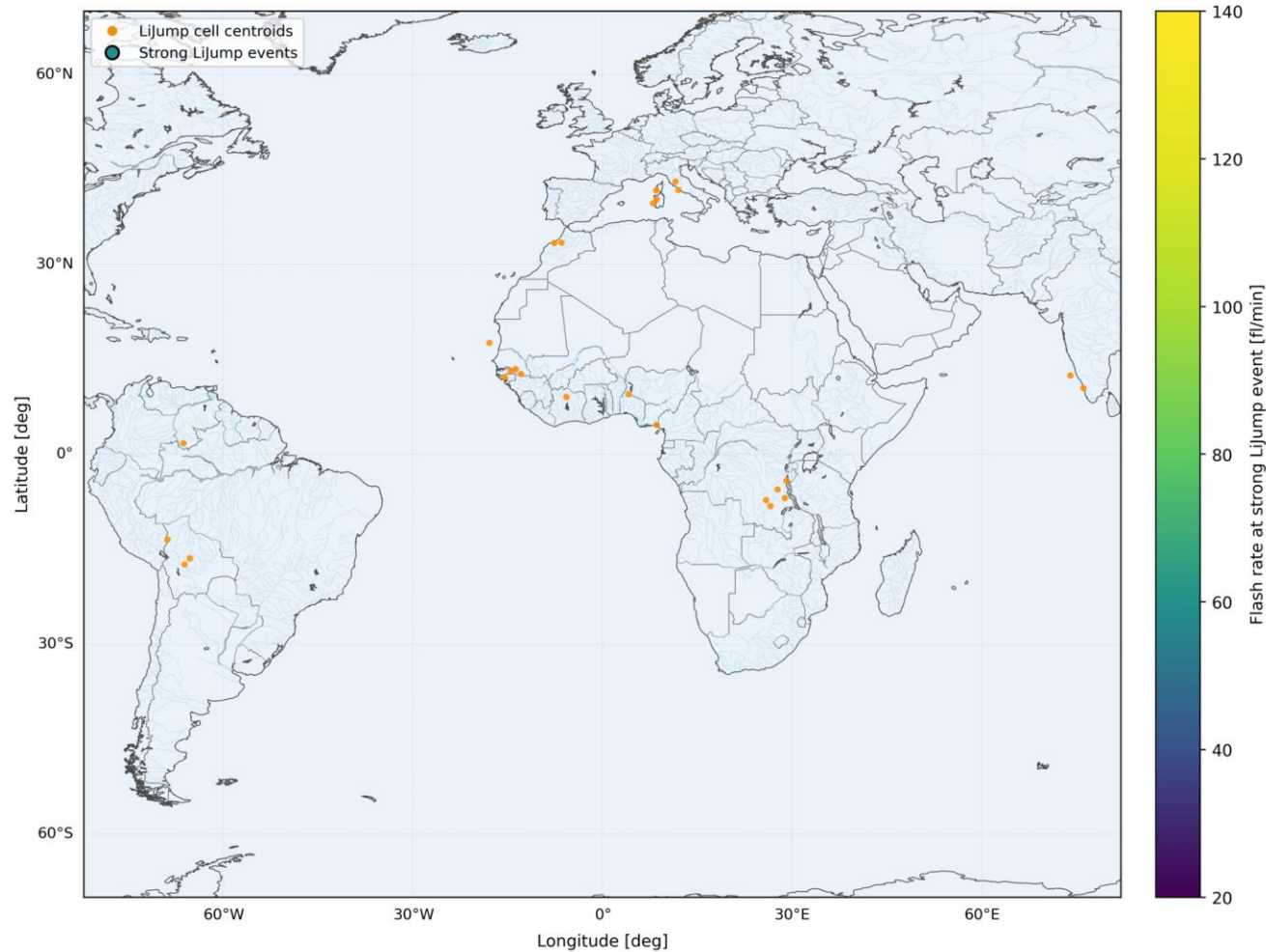




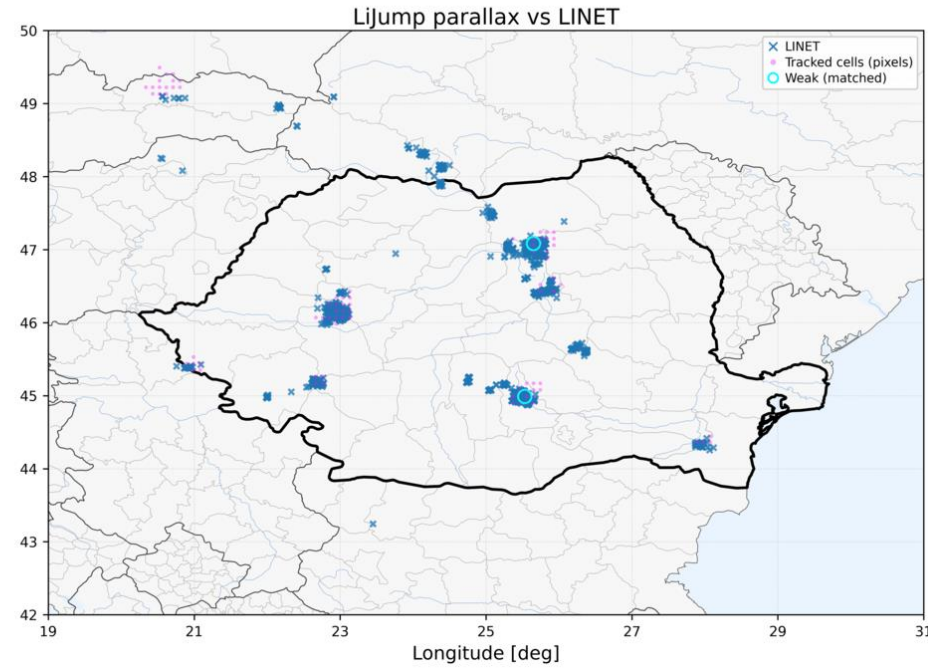
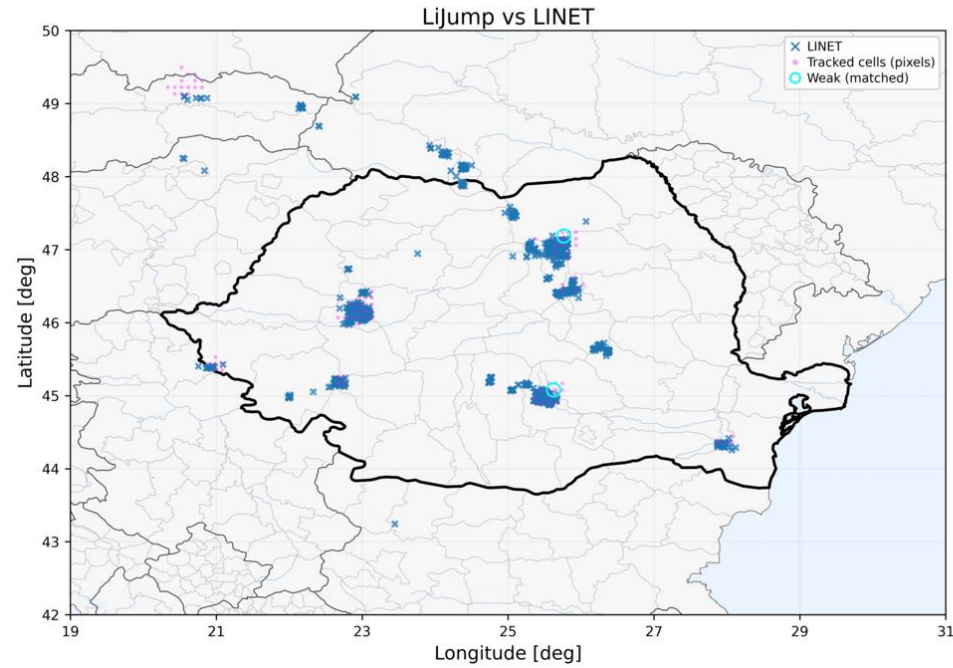
Lijump — Weak layer
2026-10-08 06:37 UTC



Lijump — Strong layer
2026-10-08 04:30 UTC



Lijump vs LINET | 2026-06-29 13:30 - 2026-06-29 13:40 UTC | parallax_applied_for_detection=1



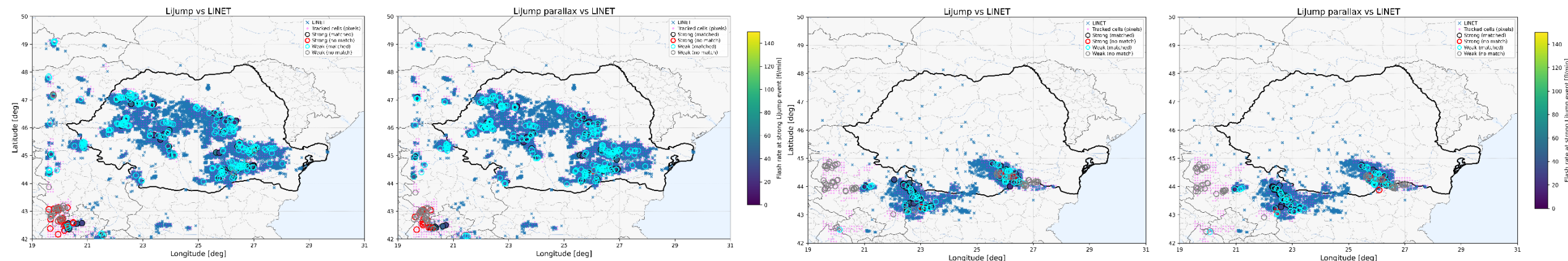
-no strong lightning jump,
just weak lightning jump, but
2-3 cm diameter hail



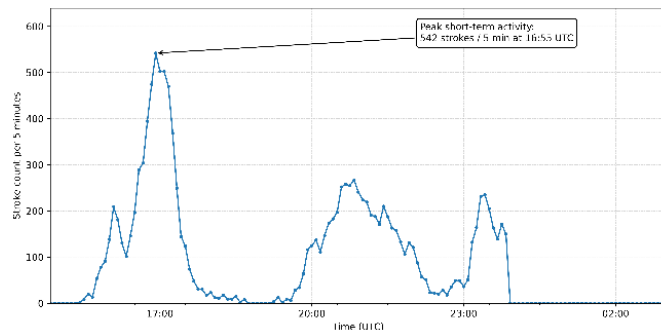
30 June – 1 July 2026, Bucharest Nowcasting Storm

Lijump vs LINET | 2026-06-30 14:50 - 2026-06-30 18:00 UTC | parallax_applied_for_detection=1

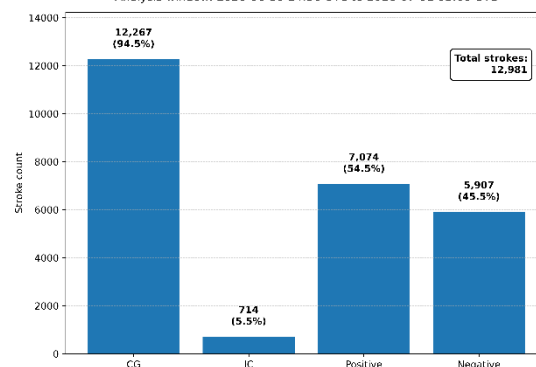
Lijump vs LINET | 2026-06-30 20:50 - 2026-07-01 03:00 UTC | parallax_applied_for_detection=1



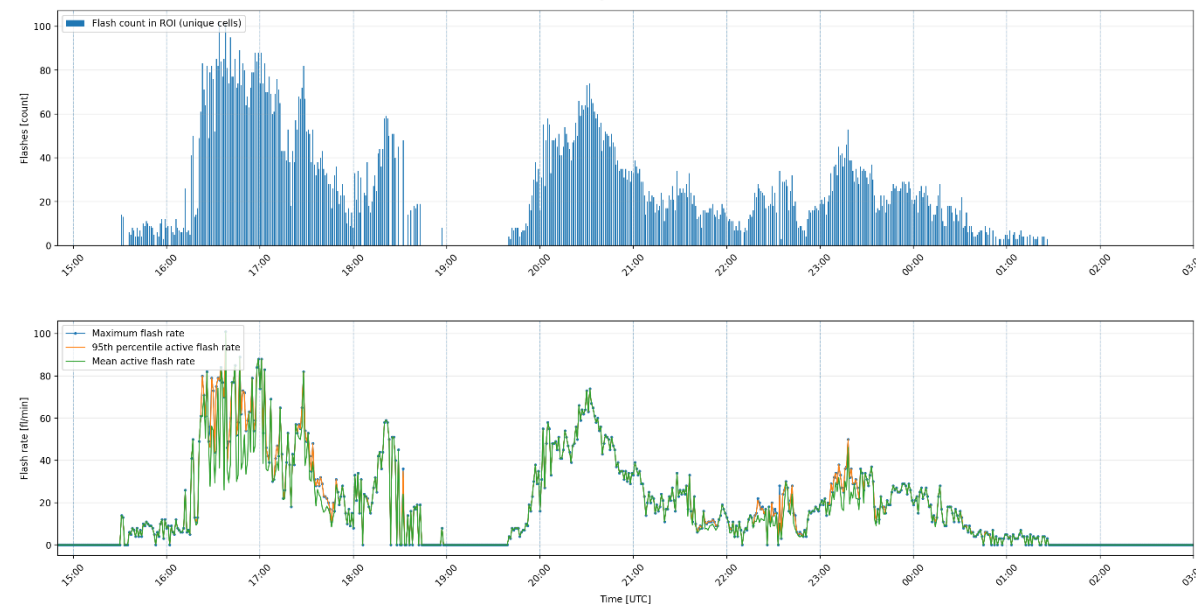
Chronological variation of LINET lightning activity in the Bucharest-Ifov ROI
5-minute stroke counts | ROI: 25.75 - 26.55°E, 44.15 - 44.85°N | 2026-06-30 14:50 UTC to 2026-07-01 03:00 UTC



Stroke-type and polarity composition of LINET detections in the Bucharest-Ifov ROI
Analysis window: 2026-06-30 14:50 UTC to 2026-07-01 03:00 UTC



Flash variation over ROI Bucharest-Ifov — consolidated chronological view
Ion [25.75, 26.55], lat [44.15, 44.85] | 2026-06-30 14:50 - 2026-07-01 03:00 UTC

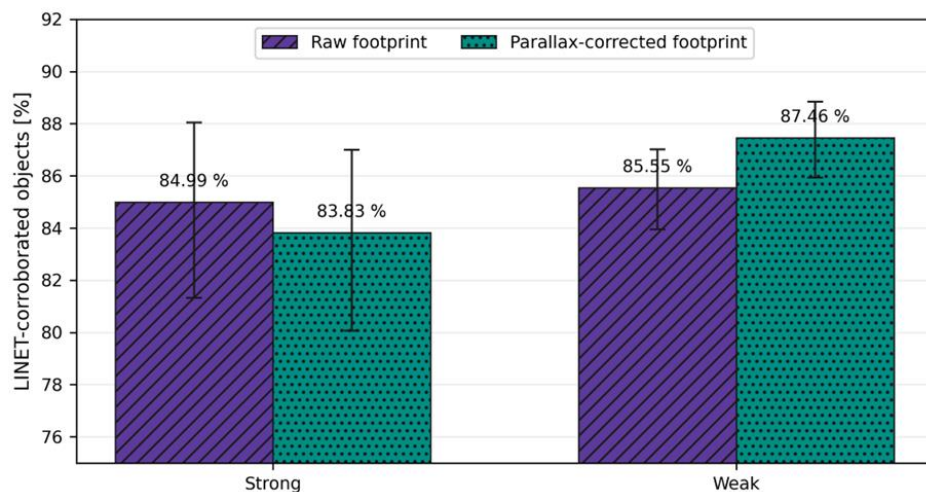


- The storm affected 60 localities across 20 counties, as well as the capital, Bucharest. Nearly 1,000 trees were blown down, 495 cars were damaged, homes and streets were flooded, and more than 27,000 customers were left without electricity.
- A metro station in Bucharest was closed after around 7 million litres of water flooded its platform.
- In Ilfov, one person died after a tree fell onto the car they were in.
- The 24-hour precipitation totals recorded at the three weather stations in the Bucharest area were 80 mm at Bucharest-Băneasa, 73.5 mm at Bucharest-Filaret, and 70.5 mm at Buchares-Afumați.

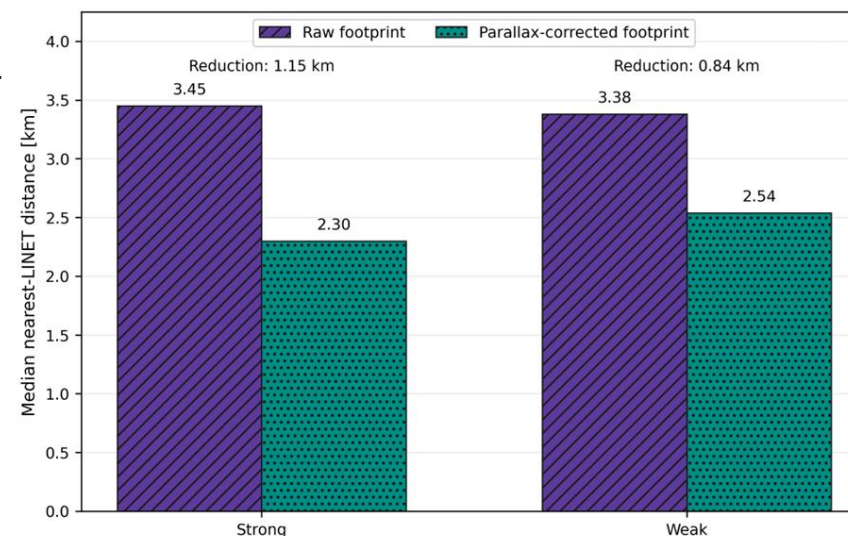
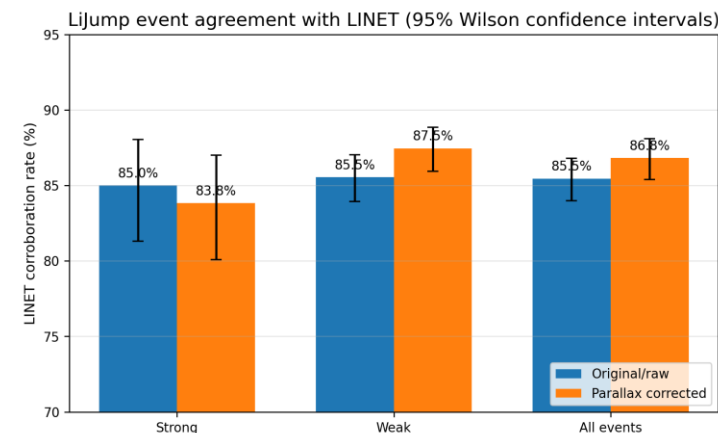


LiJump Validation over Romania territory with LINET

- ❖ Period: August 2024- June 2026 convective season
- ❖ For the validation were took into account 4,974 LiJump cases. After removing 123 exact duplicates, 4,851 unique LiJump events remain. Weak LiJump dominate the sample (about 82%), while strong account for about 18%.
- ❖ Parallax correction has a positive overall effect. The median nearest-LINET distance decreases from 3.45 to 2.30 km for strong events and from 3.38 to 2.54 km for weak events. In paired comparisons, approximately 58% of both strong and weak objects move closer to LINET after correction.
- ❖ For weak LiJump, parallax correction also improves the LINET match rate from 85.55% to 87.46% (+1.91 percentage points). For strong LiJump, the rate decreases slightly from 84.99% to 83.83% (-1.15 percentage points), even though the positional distance improves.



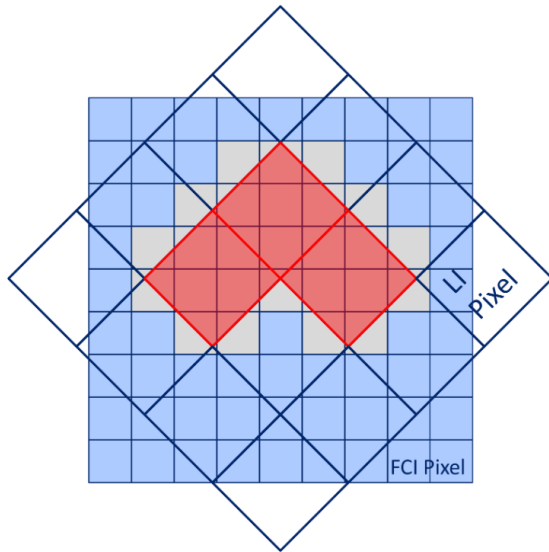
LINET agreement rates for raw and parallax-corrected strong and weak LiJump. Error bars show 95 % Wilson confidence intervals. Purple hatched bars represent raw footprints and teal dotted bars represent parallax-corrected footprints.



Median distance from raw and parallax-corrected LiJump to the nearest LINET stroke. Lower values indicate closer spatial consistency. Purple hatched bars represent raw footprints and teal dotted bars represent corrected footprints. The reduction is 1.15 km for strong events and 0.84 km for weak events.



- This product can accumulate lightning data over a user configurable period of time with a longer accumulation period than the original EUMETSAT MTG-I/LI gridded EUMETSAT L2 accumulated products which is 30 seconds, and provide information grouped on the MTG-I/FCI infrared FCI 2km grid for Accumulated flashes (AF), Accumulated Flash Radiance (AFR) and Accumulated Flash Area (AFA).
- The user will be able to configure the software to define the accumulation time period and the time update. At the same time, if the user would like to correlate or to compare the LiStack products with the ground-station data a, a parallax correction will be available and configurable by the user. This correction can be applied using the NWC SAF GEO-I Cloud-Top Temperature and Height (CTTH) product.
- In addition, the configuration file allows the user to select a fixed altitude (a constant value in km) to be used when CTTH files are missing, invalid, or when the user specifically prefers to use this option instead.



The diagram illustrates the reprojection of three accumulated LI pixels (red pixels within the grid tilted at 45°; pixel size 4.5 km) onto the FCI level 1c grid (gray pixels within the light blue-colored grid; pixel size 2 km).

- ❑ Accumulated Flash Radiance (AFR-FD): **21 files per cycle** (20 body chunks and one trail file) - for 10 minutes accumulation
- ❑ Accumulated Flashes (AF-FD): **21 files per cycle** (20 body chunks and one trail file) - for 10 minutes accumulation
- ❑ Accumulated Flash Area (AFA-FD): **21 files per cycle** (20 body chunks and one trail file) - for 10 minutes accumulation
- ❑ The developed code can also be used for all **LI Level 2 to accumulate products for an accumulation time period user configurable**: Accumulated Flash Area (AFA), Accumulated Flashes (AF) and Accumulated Flash Radiance (AFR).
- ❑ Accumulation window in minutes, examples: 5, 10, 20, 60, 1440 (1 day), 10080 (1 week), 43200 (30 days).

Advantages:

- Ensures increased control over the processed data;
- Allows efficient resource management and optimization of the workflow, which are essential aspects for achieving precise and effective results.

Disadvantages:

- High complexity, strict requirements, and the need for a meticulous approach, as the programmer must have a deep understanding of both memory allocation and its manipulation.

Table 1. Main Stages of Program Execution.

Nr.	Main Steps	Description
1.	Reading the configuration files	Reading the necessary information to identify the satellite's position as well as the bands used
2.	The initialization of variables	Allocating the necessary memory for matrices to ensure the proper execution of the program
3.	Reading input files	Reading satellite data over a configurable time period using the variables t_minus and t_plus, which represent the start and end times of the data of interest for processing.
4.	Data accumulation	Populating a common matrix set with all the data read in the previous step.
5.	Parallax Correction	Based on the CTTH product (ctth_alti) or when CTTH is missing or invalid, the system uses a configurable constant fallback height to maintain continuity of processing and to prevent systematic product gaps.
6.	Writing output files	Generating a NetCDF file that contains the final data.
7.	Free memory	In the C programming language, it is necessary to both allocate and free the used memory at the end of execution.

New functions created:

1. ParallaxCorrection
2. WriteLIPProduct

```
Status ParallaxCorrection(Utc *slot,
                          Psing_region *region,
                          Float_32 **ctth_m,
                          Float_32 **lat,
                          Float_32 **lon,
                          Float_32 ***AFA_io,
                          Float_32 ***AF_io,
                          Float_32 ***AFR_io)
```

```
Status WriteLIPProduct(Utc *slot, Psing_region *region, Sat_res res, char **argv, Float_32 **dataAFA, Float_32 **dataAF, Float_32 **dataAFR,
                      Float_32 **dataMFA, Float_32 **dataTOE, Float_32 **dataFED, unsigned char **li_quality, Float_32 **lat, Float_32 **lon,
                      int APPLY_PARALLAX_CORR, Float_32 **sat_zen, Float_32 **ctth)
```

Parallax Correction Algorithm:

LiStack provides an optional parallax correction stage that can be applied after accumulation.

The correction is geometry-based and relies on satellite viewing angles together with an estimate of the emission height. When available, CTTH information provides a spatially varying height field that improves the storm-top altitudes.

When CTTH is missing or invalid, the system uses a configurable constant fallback height (integer positive value) to maintain continuity of processing.



```
# 1. Identifier of the PGE
# -----
PGE_ID GEO-LiStack
#Not used in the LiStack accumulation itself, but can be use for reference/visualization workflow
SAT_BANDS IR38, IR87, IR97, IR105, IR123, IR133

# 2. Processing region
# -----
/*
 * REGION_CFG is the NWCLIB region file used by LiStack.
 *
 * Examples:
 *   REGION_CFG global.cfg
 *   REGION_CFG EUR-MLAND.cfg
 *   REGION_CFG Spain.cfg
 *   REGION_CFG New_Custom_Region.cfg
 */
REGION_CFG          EUR-MLAND.cfg

/* ----- */
/* 3. Accumulation and Parallax options
/* ----- */
/* APPLY_PARALLAX_CORR:
 * 0 = NO parallax correction:
 *   - output: LI file WITHOUT parallax only
 *
 * 1 = ONLY parallax-corrected LI file:
 *   - LI file WITH parallax only
 *
 * 2 = BOTH files:
 *   - output: one LI file WITHOUT parallax
 *   - output: one LI file WITH parallax
 *In all cases: accumulation window is ACCUM_MINUTES (user configurable)
 */
APPLY_PARALLAX_CORR    2

# Accumulation window ending at the requested slot, in minutes.
ACCUM_MINUTES          10
```

```
/* ----- */
/* 4. CTTH configuration (used for the parallax correction)
/* ----- */
/* CTTH_STRICT:
 * 1 = only a CTTH with exactly the requested nominal slot is accepted
 * 0 = nearest CTTH within CTTH_MAX_AGE_MINUTES is accepted
 */
CTTH_STRICT            1

CTTH_DIR                /home/safnwc/import/Obs_data/Lightning

/* CTTH_SOURCE_REGION controls the spatial relationship between the LiStack
 * processing region and the CTTH file:
 *
 * AUTO                = recommended. Prefer an exact target-region CTTH.
 *
 * EXACT                = legacy behaviour. Only accept CTTH whose region_id and grid
 *                       exactly match the selected LiStack region.
 *
 * EURMLAND            = force the EUR-MLAND CTTH source. A smaller custom region is
 *                       cropped/remapped from that CTTH if it is fully contained.
 *
 * global              = force the global/full-disk CTTH source. A smaller custom
 *                       region is cropped/remapped from the global CTTH.
 */
CTTH_SOURCE_REGION      AUTO

# 1 = also search subdirectories of CTTH_DIR; 0 = direct directory only.
CTTH_RECURSIVE          1

# Used only when CTTH_STRICT=0.
CTTH_MAX_AGE_MINUTES    30

/* ----- */
/* 5. Parallax User Configurable
/* ----- */

# CTTH_HEIGHT_PERCENT (Percentage of the CTTH height used to compute the parallax displacement)
# -----
# Examples:
# 10 = very small parallax
# 30 = moderate parallax
# 80 = default
# 100 = full CTTH height
CTTH_HEIGHT_PERCENT     100

# CTTH_FALLBACK_KM
# -----
# The altitude (km) used when CTTH is missing/invalid
# Also used as the constant parallax height when big accumulation fallback is forced
CTTH_FALLBACK_KM        25.0

/* ----- */
/* 6. very long accumulation
/* ----- */
/* If enabled and ACCUM_MINUTES >= BIG_ACCUM_MINUTES, CTTH search is
 * intentionally skipped and the constant fallback height is used.
 */
BIG_ACCUM_FORCE_FALLBACK 1

# Example: 10080 minutes = 1 week.
BIG_ACCUM_MINUTES        10080
```

Configuration File:

0. A parallax correction will not be applied;
1. Apply a parallax correction;
2. The Software will provide 2 output files; one with parallax correction and a second one without. In all cases: accumulation window is ACCUM_MINUTES (user configurable).



Accumulated Flash Area (AFA)

- provides information about the area covered by the optical emission of each lightning strike.
- “how large the electrically active cloud-top area is” during the last 30 seconds; shows the spatial footprint of recent lightning-related optical emission.
- look first at AFA, fits well with an overlay with the FCI based products with an accumulation; rolling 5-minute AFA, and in some workflows even 8-10 minutes can be more readable for storm evolution and FCI comparison, based on the MTG-FCI chunk map.

Accumulated Flashes (AF)

- it complements AFA by providing information about the variation in the number of events in an area of interest where lightning activity has been observed.
- “where lightning activity is being mapped”. In practice, treat it as a gridded activity-loading field, not as a clean count of storm objects or a count of flash centroids.
- harder to explain operationally.

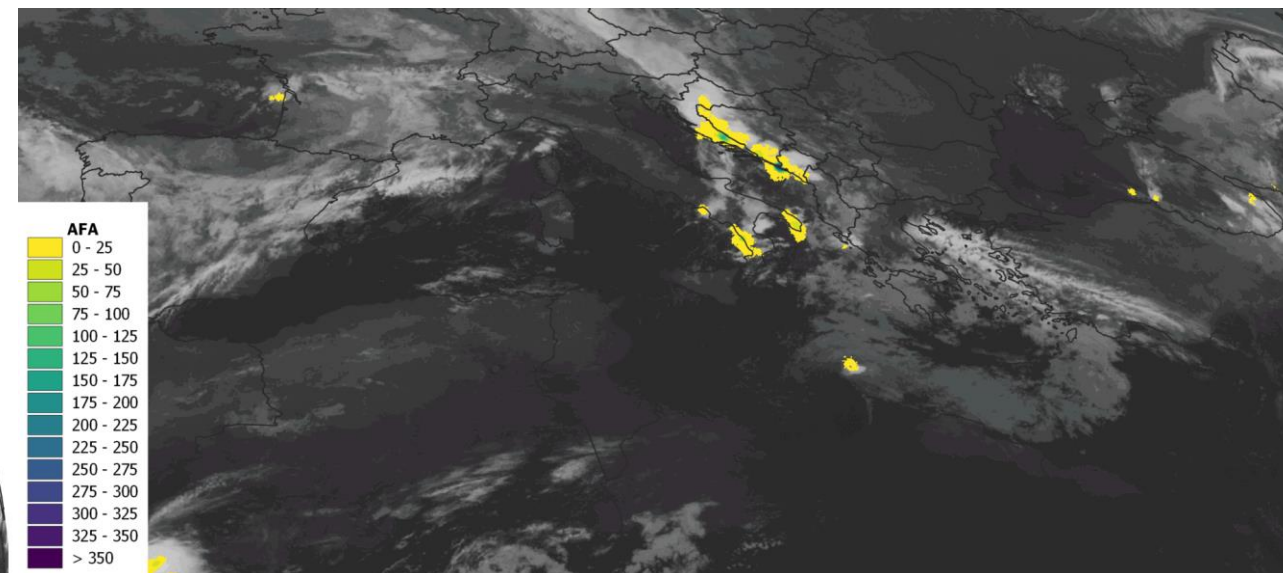
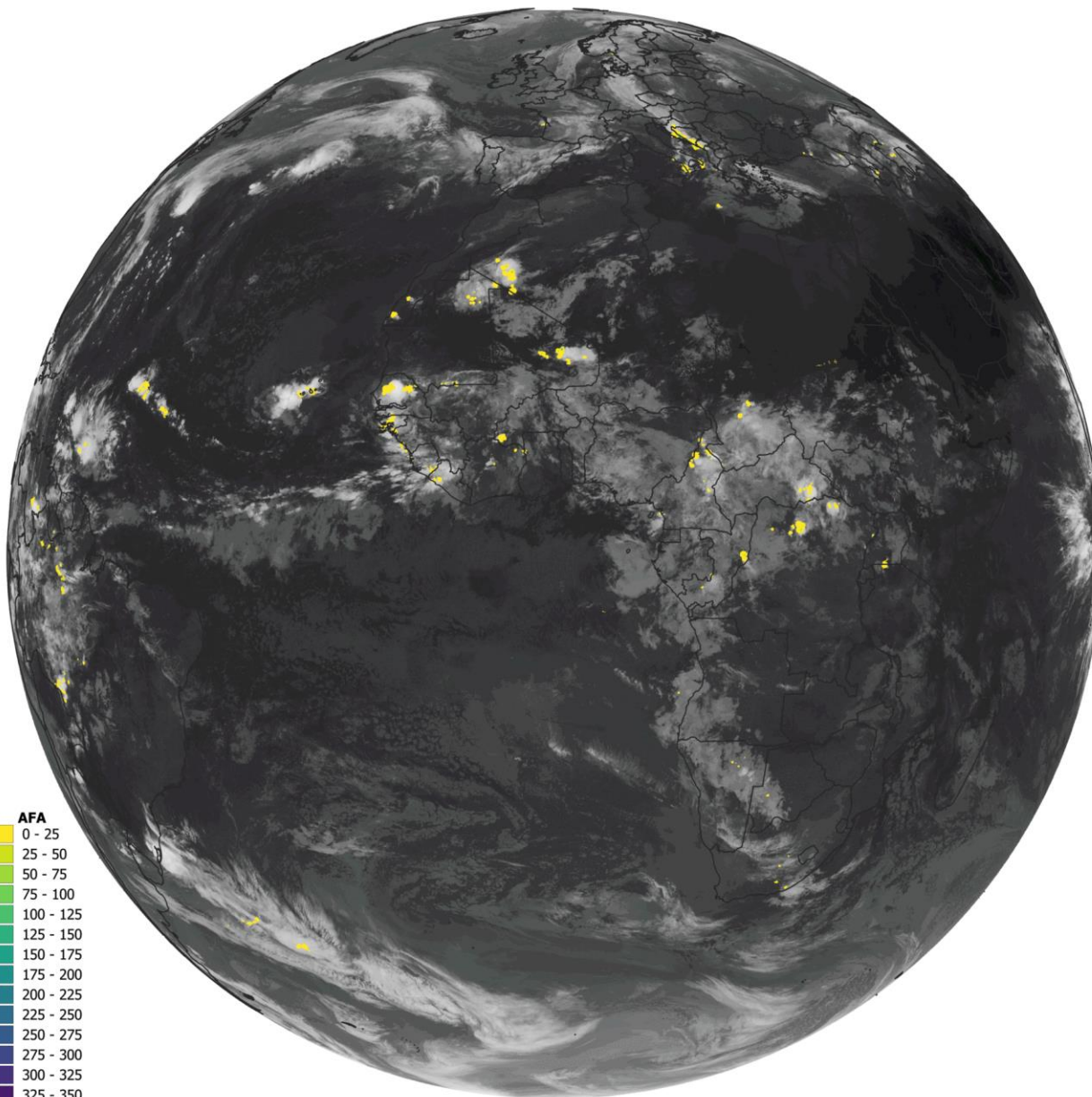
Accumulated Flash Radiance (AFR)

- it provides information about the pixel-by-pixel variation of accumulated optical emissions over a 30-second period.
- “how strong the optical lightning signal is” in each grid pixel during the last 30 seconds. It is useful, but it is not the same thing as flash rate.
- can be used as a second layer

When a comparison of the LI products is performed with radar, rain, or surface impacts, think about parallax, implemented for both LiJump and LiStack products.



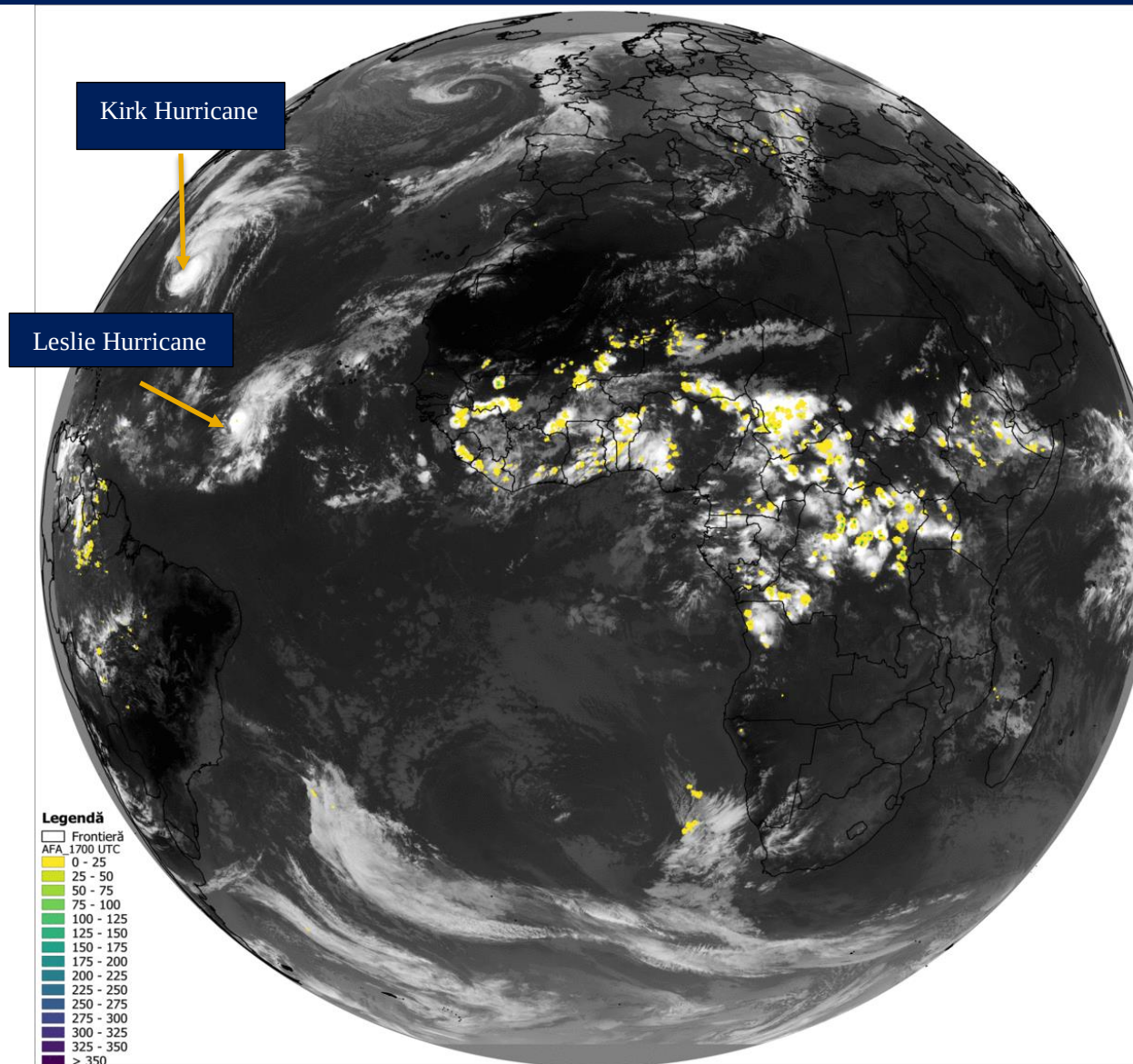
September 24, 2024, 05:00 - 07:00 UTC

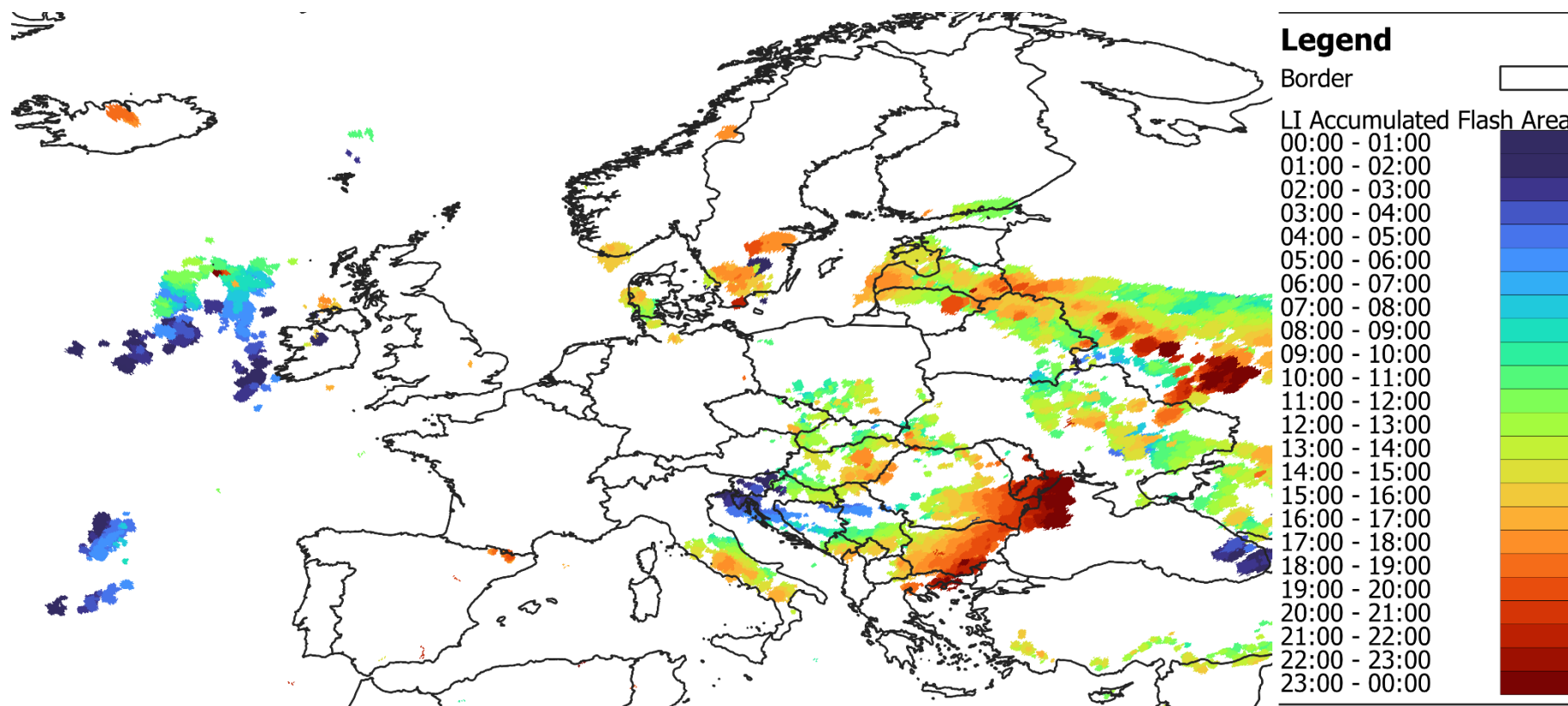


Animation of 10 minutes accumulation of Accumulated Flash Area (AFA) product for September 24, 2024, from 05:00 to 07:00 UTC.



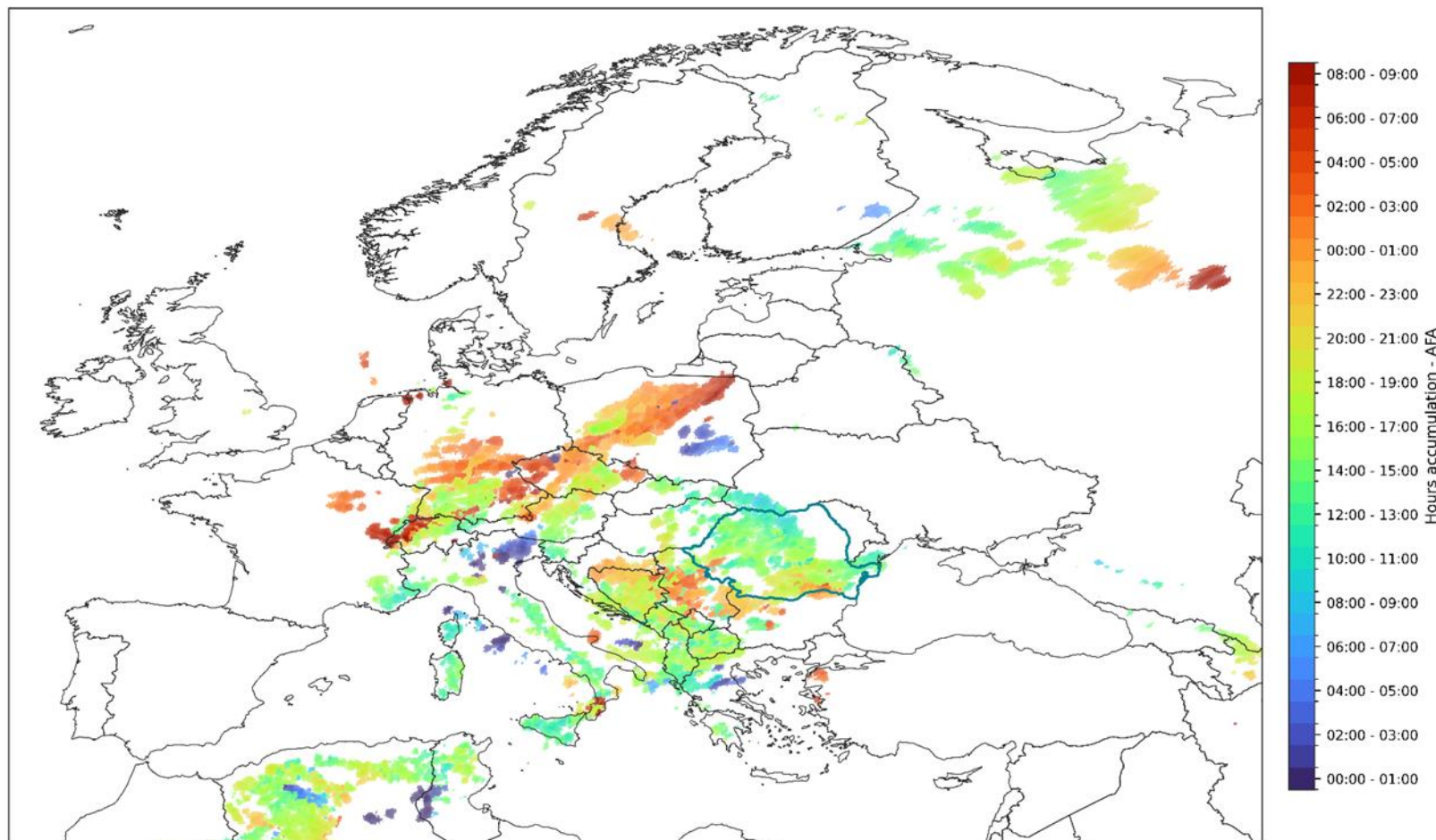
October 5, 2024, 17:00 - 19:00 UTC



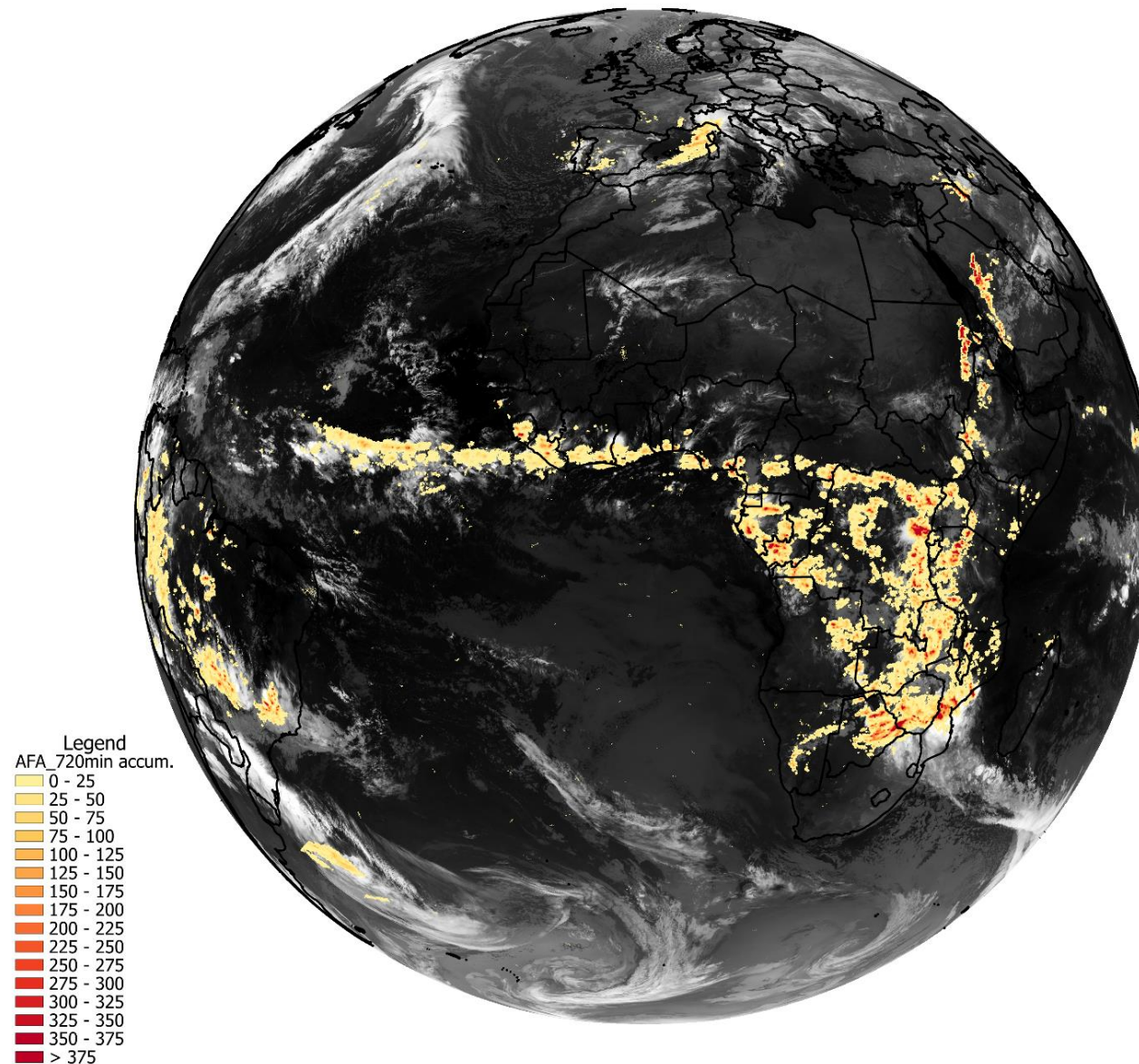


Accumulated Flash Area (AFA) product for July 17, 2025, every 60 minutes accumulation

Accumulated flash area (AFA) - 60-min accumulation
2026-06-30 00:00 - 2026-07-01 09:00 UTC



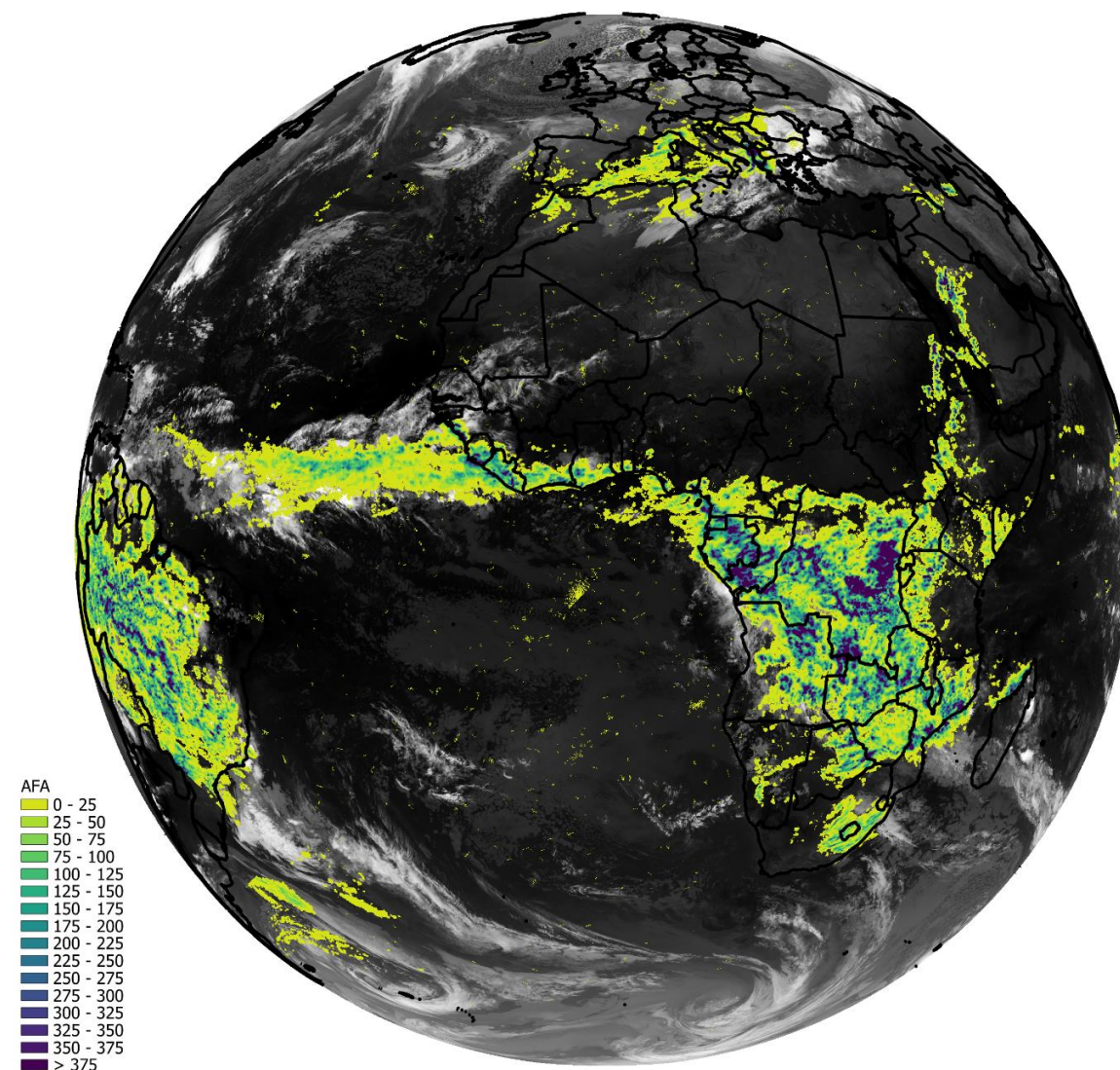
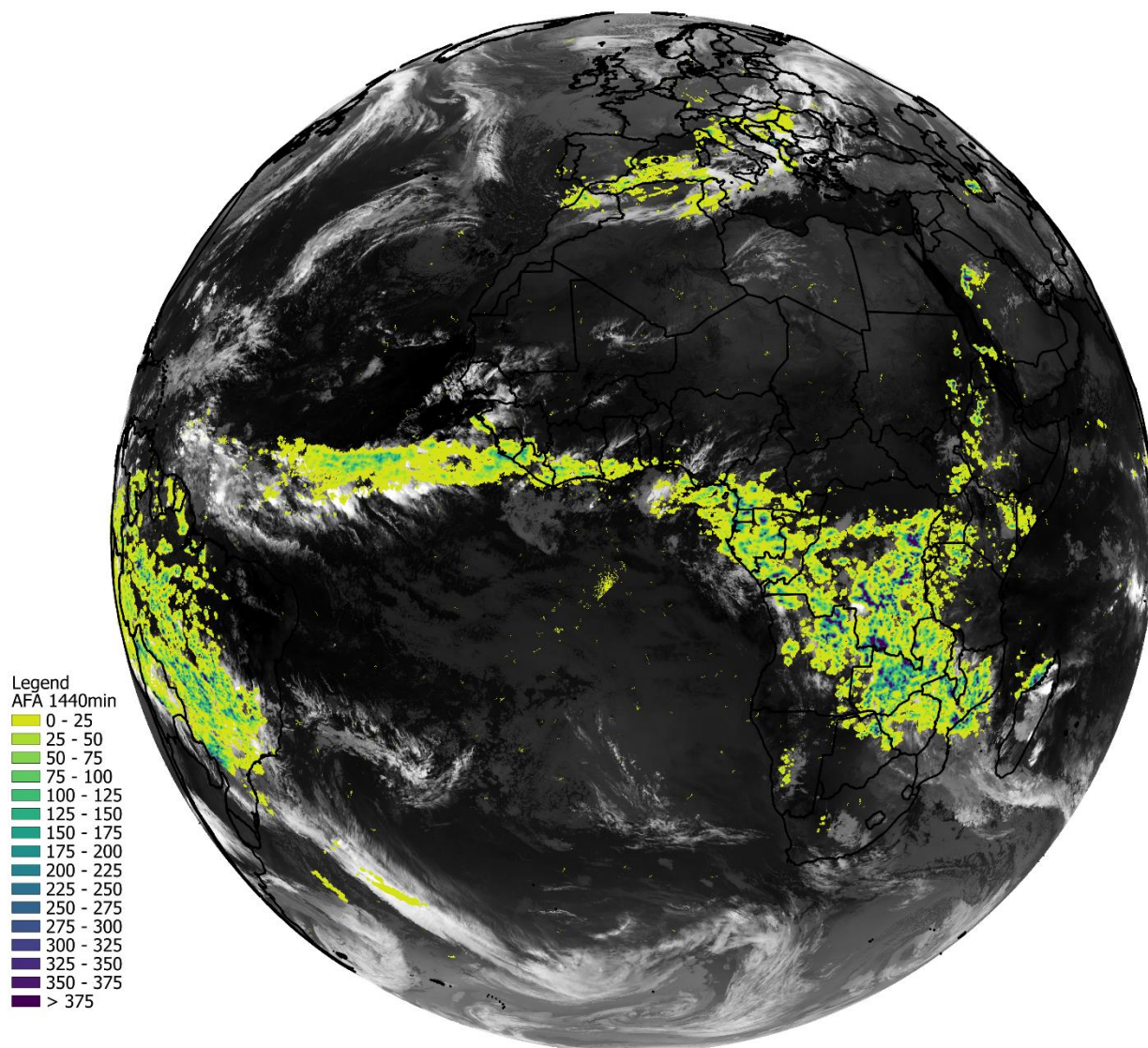
Accumulated Flash Area (AFA) product for June 30 – July 1, 2026, accumulation at every 60 minutes over all day of interest.



Accumulated Flash Area (AFA) product for November 16, 2025, **half day accumulation** from 12:00 to 00:00 UTC



Accumulated Flash Area (AFA) product for **November 17, 2025** - 1440 min (left) and accumulation for 2 days a half - 3600 min (right).



- MET-12 represents a major innovation, integrating advanced tools for lightning detection and atmospheric monitoring.
- The LiStack product offers a high degree of flexibility in its configuration options.
- LiJump was recognized as scientifically, with significant potential for severe convective applications.
- Future plans: users feedback and training activities.
- **CDOP-5** new product, LiFcast, to forecast lightning activity in the next minutes.



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Thank you very much for your attention!

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