Christophe Suarez – August 14, 2025

Capturing red sprites on camera

Introduction

Following numerous requests regarding the shooting parameters for photographing red sprites, I have prepared a brief guide with information about my method. This time, I am primarily addressing photo and video specialists. While the technical level is not overly complex (I believe it is understandable for an advanced amateur), it is far from the lyrical approach I usually convey through my images. Some of my shots, I admit, require a bit of technical knowledge. Here is the hidden part of the iceberg... I invite friends who wish to delve deeper into the subject to ask questions or share comments via direct messages on social media.

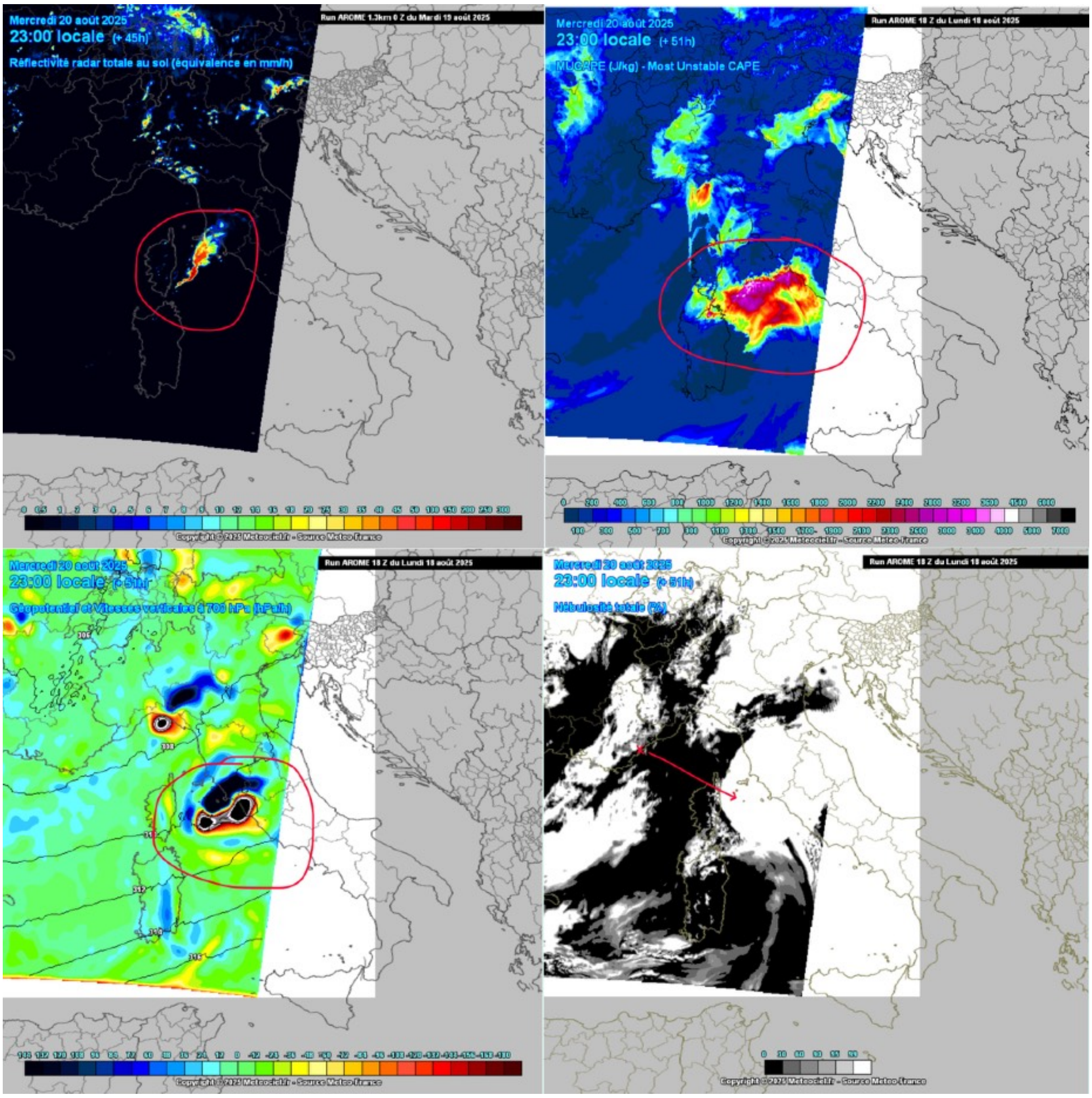
Storm Forecasting

The occurrence of red sprites above storms appears to be much more frequent than enthusiasts thought in the 20th century, or even until the 2010s. While advancements in photographic equipment have simplified capturing transient phenomena from the ground, immortalizing them remains a challenge.

Photographing red sprites is possible thanks to a combination of favorable elements. The prerequisite is analyzing weather models and the probability of clustered storms within a 700 km radius. Theoretically, depending on the altitude of the shooting location, they can be photographed up to 800-1000 km away, but I prefer storms located within 500 km of my position.

- Precipitation forecasts show the expected intensity and extent of the storm system. You can approach the search like a classic storm forecast, but it is important to note that isolated small cells are unlikely to produce red sprites. MCS (mesoscale convective systems), on the other hand, are more favorable.

- The sky between the photographer and the storms should be as clear as possible. The cloud cover parameter in weather models is very useful.



Forecasting conditions conducive to red sprites

Example Parameters to Consider Here, I use the Arome model (Météo France) provided by meteociel.com It is not forbidden—and even recommended—to cross-reference forecasts with other models available for the region, such as Icon CH2.

Note: In this example, subsequent model runs (scenarios) showed a slightly different situation (a bit further east). Always maintain perspective with models, do not fixate on a single run, and follow the evolution as weather models update.

In the field

Red sprites appear above powerful cells that are generally part of storms over a geographically extensive area (MCS). They often appear after 2 or 3 hours of lightning activity, in the coldest parts of the storm, and are mostly associated with positive lightning strikes exceeding 100 kA. Sometimes, they are linked to a nascent cell in an area already heavily struck by lightning in the previous hour. Red sprites can be isolated, but a cell that starts producing them often continues to do so.

In the field, cells producing sprites generally emit flashes visible hundreds of kilometers away. A dark sky, free of light pollution, is ideal. However, it is also possible to capture images with moonlight or above cities.

Red sprites dancing above a storm near Venice. Captured from Nice

In near real-time, you can get an overview of the potential of a storm cluster by checking the "Satellites Cloud Tops Alerts" parameter on meteologix.com, for example. The redder the storm area, the colder the tops of the cumulonimbus clouds, indicating powerful storms. In short, at a glance, you can assess the potential of ongoing storms. There is little to expect from a blue or slightly green area. Be careful not to confuse this with a precipitation map!

It is also on meteologix.com that I find indications of lightning strikes most likely to produce red sprites. These are generally positive strikes exceeding 40 kA and preferably 100 kA. On Meteologix, go to "Radar & Lightning" and then "Lightning Detection Europe." On the left side, set the cursor to "Wild House Shaker" to see lightning strikes over 100 kA. It can also be interesting to set the cursor to "Angry Roarer," as these can also—though to a lesser extent—trigger red sprites.

Positive lightning close to Geneva

Step-by-Step Methodology

Using a website or app, I locate the position of storm cells and then use a smartphone app to determine the distance and azimuth of the storm relative to my position.

- Locate the storm's position on a map with Windy, Blitzortung, Meteologix, etc.
- A smartphone app, such as Planit, allows you to determine the distance and azimuth of the storm. Depending on the distance, choose the focal length of the lens to mount on the camera:

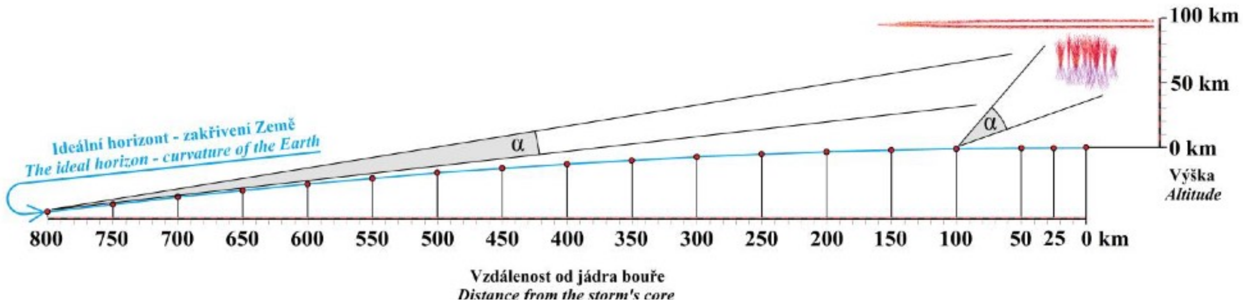
Beyond 300 km = 50mm
Between 200 and 300 km = 35/40mm
Between 100 and 200 km = 20/24mm

It is possible to get closer to the phenomenon with an 85mm or longer telephoto lens, but this requires some experience.

Pozorovací úhly TLE vůči vzdálenosti bouře při ideálním horizontu.
Observation angles of the TLE from the storm's distance on the ideal horizon.

	Celý jev – výška 50-90 km *All phenomena – altitude 50-90 km*					Tělo – výška 60-80 km *Body – altitude 60-80km*		Elf – výška 90-95 km *Elves – altitude 90-95 km*	
Vzdálenost: *Distance:*	Střed: *Center:*	Jednotlivý - šíře 5 km: *Single - width5 km:*		Skupina - šíře 50 km: *Group – width 50 km:*		Jednotlivý - šíře 5 km: *Single - width 5 km:*		Šíře 350 km: *width 350 km:*	
25 km	**67°**	57-77°	α = 20°	43-90°	α = 47°	60-76°	α = 16°	24-148°	α = 124°
50 km	**52°**	41-63°	α = 22°	33-75°	α = 42°	50-58°	α = 8°	22-143°	α = 121°
100 km	**33,5°**	24-43°	α = 19°	21-51°	α = 30°	29-38°	α = 9°	18-128°	α = 110°
150 km	**23,5°**	16-31°	α = 15°	14-35°	α = 21°	21-28°	α = 7°	15-104°	α = 89°
200 km	**17,5°**	11-24°	α = 13°	10-26°	α = 16°	15-21°	α = 6°	13-74°	α = 61°
250 km	**14°**	9-19°	α = 10°	8-21°	α = 13°	12-17°	α = 5°	11-51°	α = 40°
300 km	**12°**	8-16°	α = 8°	7-18°	α = 11°	9-14°	α = 5°	9-36°	α = 27°
350 km	**10°**	6-14°	α = 8°	5-15°	α = 10°	7-12°	α = 5°	8-28°	α = 20°
400 km	**8,5°**	5-12°	α = 7°	4-13°	α = 9°	6-10°	α = 4°	7-22°	α = 15°
450 km	**7°**	4-10°	α = 6°	3-11°	α = 8°	6-9°	α = 3°	6-18°	α = 12°
500 km	**5,5°**	3-8°	α = 5°	2-9°	α = 7°	4-7°	α = 3°	5-15°	α = 10°
550 km	**4,5°**	2-7°	α = 5°	2-8°	α = 6°	3-7°	α = 4°	4-13°	α = 9°
600 km	**4°**	2-6°	α = 4°	2-7°	α = 5°	3-6°	α = 3°	3-11°	α = 8°
650 km	**3,5°**	2-5°	α = 3°	2-5°	α = 3°	2-5°	α = 3°	3-9°	α = 6°
700 km	**2,5°**	1-4°	α = 3°	1-4°	α = 3°	1-4°	α = 3°	2-8°	α = 6°
750 km	**2°**	1-3°	α = 2°	1-3°	α = 2°	1-3°	α = 2°	2-7°	α = 5°
800 km	**1°**	0-2°	α = 2°	0-2°	α = 2°	0-2°	α = 2°	1-6°	α = 5°

Autor: Daniel Ščerba (www.scerba-daniel.cz , daniel.scerba@post.cz). Consultation and support: Martin Popek



Observation angles of the TLE from the storm's distance on the ideal position - © Daniel Ščerba

To find the azimuth at night and point the camera in the right direction, two apps are useful. The first, Peakfinder, allows you to find an azimuth using nearby mountain peaks. If I do not see any high points in the desired direction, I use an astronomy app. I chose Astro Calculator for its ease of use. With the sky plot map, I find the azimuth of the main visible celestial bodies in real time. Using a planet or star, I easily point toward the sprite-producing cell.

Christophe Suarez chasing red sprites

Photo Shooting Mode

Jellyfish sprite above a storm over Corsica, photographed from Genoa

Photography is the most straightforward method to implement. A very bright lens (F/1.4 or better) at full aperture is paired with a sensitive, preferably large-sensor camera. For beginners, the ideal focal length is 50mm, which is suitable for storms 300 km or more away. Below 250 km, a 35mm lens is preferred, and beyond 500 km, 85 to 135mm. In terms of aperture, a 135mm at F/1.8 is still acceptable. Since the sprite is very brief, the shortest possible exposures (1 to 3 seconds) in RAW mode are chosen. Sensitivity is set between 3200 and 6400 ISO. In photography, the red sprite is drowned in the light captured over the duration of the exposure. With luck, it is very powerful. If, in addition, the sky is very clear, one can hope for a beautiful image. The approach can be frustrating because one must then sort through hundreds or thousands of images in search of a very faint red glow.

Example of equipment used in photography: *Nikon Z6, Sigma 50/1.4 lens, remote control, Manfrotto 055 tripod.*

Tip: Configure the camera in focus peaking mode (red, maximum intensity). If a sprite appears, a red trail is clearly visible on the LCD. You can also use an external 5.5" screen. The advantage is that it allows for fine manual focusing of the lens and comfortably detecting a potential sprite cell before starting burst shots.

Video Shooting Mode

Red sprites over the Mediterranean, captured from Èze (French Riviera)

Video is a particularly suitable method for capturing red sprites. At 25 frames per second, each exposure lasts 40 ms. The phenomenon is brief but is not polluted by the light of a long exposure. The sprite or cluster of sprites is captured in one or two frames. A good ISO boost is essential, especially if you want to enhance the image with a beautiful night composition. Without the moon, it is not uncommon to go up to 40000 ISO. With a bright moon, 10000 ISO is sufficient. Regarding lenses, as with photography, it is recommended to use F/1.4 lenses. In some cases, F/1.8 or F/2 lenses are acceptable (for focal lengths over 100mm, with nearby storms).

The images are then extracted from the video using Photoshop or any dedicated video program. Unless you have high-end equipment, the extracted file is usually a PNG or JPG, which leaves less room for maneuver in post-processing than a RAW file. Despite this lesser flexibility, this technique yields good results. A specialized noise reduction program is recommended (such as DeNoise AI). Be careful: if the chosen format is 16:9, the image is cropped in height. This should be taken into account when choosing the focal length.

Example of equipment used in video: *Sony A7s, SONY FE 50/1.4 GM lens, wired remote, Manfrotto 055 tripod.*

Equipment

This chapter comes last because, while equipment is essential, it's not the most important factor. The best images are those you create with skill, passion, and perseverance. Naturally, your expertise is at the heart of success.

I'll start with the most important accessories—the ones without which your images will never be perfectly sharp. The tripod is certainly not the least important link in the chain. Ideally, a wooden tripod is best. For my part, I've invested in heavy aluminum tripods like the Manfrotto 055. Equivalent models from other brands will work just as well. I never hesitate to spread the legs wide, especially when a breeze threatens the stability of the setup. If you already have a tripod head, it will do the job just fine.

All digital cameras are capable of capturing red sprites, even those over ten years old. If I had to choose the most suitable camera body for this activity, I'd go for a model from the Sony a7x series, Nikon Z6x, or Canon Rx. These cameras offer excellent high-ISO performance and have a vast selection of available lenses. Special mention goes to the A7s and its variants (A7s II and III), which are ideal for this activity, though they're less versatile for general photography. Some even go as far as having their camera refiltered with an astro filter (like the Astronomik L2) to gain a bit more signal in the infrared range—that is, for the red of the sprites.

In short, you can use the camera body you already own (I just saved you a few hundred euros!).

What will make the difference is the lens. There's no secret: red sprites are fleeting and faint. While it's possible to photograph TLEs (Transient Luminous Events) with an f/2.8 lens, I recommend a very fast lens. The minimum is f/1.8, but f/1.4 is much better. To start, a 50mm f/1.4 is the ideal lens.

If you choose photo mode, with the tripod, a good remote shutter release is the only essential accessory.

For video, you can either record internally or use an external recorder (like an Atomos). The advantage of internal recording is the simplicity of the setup: mount the camera on a tripod, attach a remote, and you're ready. On the camera's small screen, it's difficult to spot red sprites in real time. To help with this, as mentioned earlier, I enable the focus peaking feature. (Note: Nothing stops you from connecting a simple external monitor!)

With the Atomos, shooting is more comfortable because you have a larger screen (mine is 7 inches). However, the logistics are more complex. To avoid any interference, the monitor is mounted on a separate tripod. An HDMI cable connects the camera to the Atomos, and a 12V 8Ah battery powers the recorder. Setup takes a few minutes, but the results are worth the effort.

My setup in 2024 – Today, the 20mm f/1.4 has been replaced with a 24mm f/1.8 Z, and the 135mm has been swapped for a Samyang

Acknowledgements : *I would like to thank my wife Kate Suarez, who is part of all my adventures and helps me keep the passion for the elements alive, Dr. Stéphane Vetter, who introduced me to the photography of red sprites, and Mr Nicolas Escurat, who, by sharing his knowledge, helped me progress.*

Thanks to Mr Daniel Ščerba for sharing the table of calculations of observation angles of TLE 's.

I would like to thank Dr. József Bór, project manager of the UHU project https://uhu.epss.hu/en/ and administrator of the International Observers of Upper-Atmospheric Electric Phenomena group on Facebook, for his contribution, which aims to build bridges between science and the TLE enthusiast community.

I used the AI assistant Le Chat (https://mistral.ai) to help translate this document from French to English.

Naturally, if you have any information to add or ideas to enhance this guide, they will be welcome.

