

# Red sprites are best seen from space

December 5 2023, by Laurence Tognetti

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Image of a red sprite taken from the International Space Station in October 2023 by Expedition 70 Commander, Dr. Andreas Mogensen. Credit: ESA/DTU/ A. Mogensen

Planet Earth is full of some truly awe-inspiring spectacles, but few are as intriguing as sprites, which are officially known as a transient luminous event (TLE) and consist of large-scale electric discharges that shoot upward while occurring above the cloud tops in the Earth's mesosphere at approximate altitudes of 50–90 km (31–56 mi).

In October 2023, European Space Agency (ESA) astronaut, Dr. Andreas Mogensen, who is currently onboard the International Space Station (ISS) as Commander of the Expedition 70 mission, took an incredible image of a red sprite with the Davis camera as part of the Thor-Davis experiment and his Huginn mission.

Sprites have been observed from the ground and aircraft. However, the preferred observation method is from outer space due to the [sprites](#) occurring above the cloud tops and the low altitude of the ISS offering pristine views of these unique lightning features. While they are observed above [cloud tops](#), they are hypothesized to originate from normal lightning near the Earth's surface and act as a "[balancing mechanism](#)" used by the Earth's atmosphere to distribute vertical electrical charges.

Since red sprites are essentially lightning strikes and visible for only a fraction of a second, specialized event-based cameras such as the Davis camera are required to precisely capture them. The Davis camera contrasts with a normal camera in that it does not take direct photographs, but instead creates images by sensing light and contract variances. Through this, the Davis camera capabilities are analogous to a

normal camera taking 100,000 images per second.

"These images taken by Andreas are fantastic," said Dr. Olivier Chanrion, who is a senior researcher at Danish Technical University (DTU) and lead scientist for this experiment. "The Davis camera works well and gives us the high temporal resolution necessary to capture the quick processes in the lightning."

The Thor-Davis experiment builds off the Thor experiment also conducted by Dr. Mogensen during his first mission to the ISS in 2015. During that experiment, Dr. Mogensen [shot a 160-second video displaying 245 blue jets](#), which are another type of lightning event that shoots up toward space, with results from those findings being published in [a 2016 study](#) in *Geophysical Research Letters*.

The [earliest recorded report](#) of sprites—though they weren't called that right away—occurred in November 1885 from the R.M.S. Moselle as it was leaving port in Jamacia with the sprites then being described as a "meteorological phenomenon" while "sometimes tinged with prismatic hues, while intermittently would shoot vertically upwards continuous darts of light displaying prismatic colors in which the contemporary tints, crimson and green, orange and blue, predominated."

It took more than 100 years for the first photographic evidence of sprites to happen, when a team of scientists from the University of Minnesota accidentally imaged electrical discharges using a low-light-level television camera in 1989, with their findings later [published in Science](#) the following year. It wasn't until a [1995 study](#) published in *Geophysical Research Letters* that these electrical charges were officially dubbed "sprites." In the last several decades, sprites have been observed from all continents except for Antarctica, along with being observed from the ground, aircraft, and even [outer space](#).

Provided by Universe Today

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