

Green emissions associated with sprites

Sebastien Celestin⁽¹⁾, Matthieu B. Garnung^(1,2), Thomas Farges⁽²⁾, Burcu Kosar^(3,4),
and Levi Boggs⁽⁵⁾

(1) LPC2E, University of Orleans, CNRS, Orleans, France; e-mail: sebastien.celestin@cnrs-orleans.fr

(2) CEA, DAM, DIF, Arpajon, France; e-mail: thomas.farges@cea.fr

(3) NASA Goddard Space Flight Center, Greenbelt, MD, USA; e-mail: burcu.kosar@nasa.gov

(4) The Catholic University of America, Washington, D.C., USA

(5) SSRC, Georgia Tech Research Institute, Smyrna, GA, USA; e-mail: levi.boggs@gtri.gatech.edu

Upper regions of sprite discharges have recently been found to produce green optical emissions and posted publicly online (Figure 1). They are now commonly referred to as Green Ghosts. There is now a wealth of high-quality observations of TLEs captured by enthusiasts.

Newly launched NASA citizen science project “Spritacular” (spritacular.org) aims to generate a database of TLEs captured by the public and present it to the science community as a new source of ground-based observational data that can be readily utilized in scientific studies.



Figure 1. Sprite observed over Wichita, Kansas from Oklahoma by Paul Smith using a Sony A7S camera at 24 fps.

In this presentation, we investigate how high-altitude green emission can be explained qualitatively and quantitatively using streamer simulations, simplified chemistry modeling of the lower ionosphere, and spectroscopic analysis.