

An attempt to develop a new teaching material for high school students observing sprites

Tomoyuki SUZUKI^{1*}, KAMOGAWA, Masashi², HAYAKAWA, Masashi³

¹Ministry of Defense, ²Tokyo Gakugei University, ³The University of Electro-Communications

Sprites are one of the Transient Luminous Events (TLEs) and are excited above a thunderstorm with strong positive flashes. The phenomena are observed all over the world and would be produced by the removal of large amount of positive charge from the thunderstorm (cloud-to-ground discharge). In Japan, sprites are observed by many high school students by means of high sensitivity CCD cameras. They have revealed the optical characteristics of sprites (e.g. morphology and 3-dimensional location). Although sprites are produced by the removal of charges from the thunderstorm, they do not have equipments to observe electrical phenomena causative of sprites. So, we developed a material in order to provide an observation method of sprite-producing thunderstorms and their electrical properties. The equipment is a low cost field mill data acquisition system observing the surface electric field change. If they can deploy more than four field mills in short distance at most 10 km, they can estimate an amount of positive charge removed associated with sprite-producing discharge under a simple assumption. We will present the observational and analytic concepts, and the developed low cost field mill data acquisition system.

Acknowledgment

This work was supported by JSPS KAKENHI Grant Number 24909060

Keywords: teaching material, sprite, lightning, surface electric field observation, estimation of charge removed by lightning