

## れいめい衛星によるスプライト発光現象の観測 Observation of sprite events with the Reimei satellite

坂野井 健<sup>1\*</sup>, 足立 透<sup>2</sup>, 山崎 敦<sup>3</sup>, 浅村 和史<sup>3</sup>, 平原 聖文<sup>4</sup>

SAKANOI, Takeshi<sup>1\*</sup>, ADACHI, Toru<sup>2</sup>, YAMAZAKI, Atsushi<sup>3</sup>, ASAMURA, Kazushi<sup>3</sup>, HIRAHARA, Masafumi<sup>4</sup>

<sup>1</sup> 東北大学大学院理学研究科, <sup>2</sup> スタンフォード大学電気工学科, <sup>3</sup> 宇宙航空研究開発機構宇宙科学研究所, <sup>4</sup> 名古屋大学太陽地球環境研究所

<sup>1</sup>Grad. Sch. of Science, Tohoku University, <sup>2</sup>Dep. of Elec.Engineering, Stanford University, <sup>3</sup>JAXA/ISAS, <sup>4</sup>STEL, Nagoya University

The sprite emission is characterized by a vertically extending fine structure (called as carrot and column) in the altitude range from 40 to 90 km. The sprite has been measured by ground-based instruments, and there is no monochromatic imaging data from space. A satellite observation is useful to investigate the global distributions of sprite since an optical instrument on a satellite can measure the sprite in the wide range without atmospheric absorption.

The multi-spectral camera (MAC) on Reimei has taken the monochromatic images at 428 nm, 558 nm, and 670 nm with an exposure time of 957 ms in the limb direction at middle and low-latitudes from March 2008. The spatial resolution at a tangential point is 74 km. According to the noon-midnight sun-synchronous orbit of Reimei at an altitude of 7640 km, the observation is made around the midnight sector.

We found several sprites events at a wavelength of N2 1P (670 nm). For three events among them, the simultaneous observations between N2+ 1N (428nm) and N2 1P were performed. The electron temperature associated with a sprite can be estimated from the intensity ratio between emission of N2+ 1N and that of N2 1P. However, it is rather difficult to identify the N2+ 1N for these three events due to the low sensitivity of 428 nm channel of MAC. The N2+ 1N intensities of sprites are estimated to be less than 92 - 188 R, while N2 1P intensities of sprites are 10 - 12.5 kR. Therefore, we estimated the upper limit of electron temperature from these data. As a result, the upper limits of the electron temperatures are 5.5 - 6.7 eV, and the upper limits of the electric field intensities are 141 - 209 Td. The altitude of sprite emission is accurately determined with the satellite altitude data and the field-of-view of MAC. In this presentation, we will report precise estimation result of the temperatures and electric fields associated with sprites using the MSIS model.