

## Multi-spectral observations of sprite and airglow emissions by Reimei

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A satellite observation is useful to investigate the global distributions of sprite and airglow since an optical instrument on a satellite can measure the sprite and airglow in the wide range without atmospheric absorption. However, satellite data are rarely found for visible airglow emissions. The multi-spectral camera (MAC) on Reimei has taken the monochromatic images at 428 nm, 558 nm, and 670 nm with a time resolution of 1 sec or 120 msec in the limb direction at middle and low-latitudes from March 2008. The spatial resolution at a tangential point is  $\sim 4$  km. According to the noon-midnight sun-synchronous orbit of Reimei at an altitude of  $\sim 640$  km, the observation is made around the midnight sector. The Reimei camera data give us an opportunity for obtaining the snapshot of sprites and successive images of airglow distributions.

At this moment, we found four sprites events at a wavelength of N2 670 nm. For three events among them, the simultaneous observations between N2+ 428nm and N2 670 nm emissions were performed. The electron temperature associated with a sprite can be estimated from the intensity ratio between emission of N2+ 428nm and that of N2 670 nm. However, it is rather difficult to identify the N2+ 428 nm emission for these three events due to the low sensitivity of 428 nm channel of MAC. The N2+ 428 nm intensities of sprites are estimated to be less than  $\sim 400$  R, while 670 nm intensities of sprites are  $\sim 4$  MR. Therefore, we will estimate the upper limit of electron temperature from these data.

On the other hand, we have made routine observations of O 558 nm and OH 670 nm airglow emissions. During the period of 27 - 30 October 2008, we carried out the coordinated Reimei, ground-based all-sky imager (Taga), Na temperature lidar (Uji), and MU radar (Shigaraki) measurements. From a preliminary study using data on 30 October, we find the appearance of gravity wave in Na number density and temperature variations around the mesopause. In this presentation, recent results of sprites and airglow based on Reimei camera data will be presented.