

れいめい衛星による低緯度大気光ならびにスプライト観測

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Airglow and sprites observations at low-latitudes by Reimei

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It is important to observe airglow emission since airglow emission represents the dynamics and chemistry in the thermosphere. So far, the measurements of airglow were mainly carried out from ground-based instruments. However, there are some difficulties in past measurements: the field-of view is limited within hundreds kilo-meters and the optical measurements depend on the weather conditions. On the other hand, a satellite observation enables us to perform the continuous measurement of airglow distribution in the wide-range. However, satellite data are rarely found for visible airglow emissions.

The Reimei satellite carries a multi-spectral auroral camera (MAC) which can measure 428 nm (N2+ 1NG), 558 nm (OI) and 670 nm (OH Meinel band / N2 1PG) emissions. From March 2008, the observation of airglow and sprite emissions started with MAC by pointing the field-of-view toward the earth's limb at middle and low-latitudes. Since then, the observation continues routinely every two or three times a week. Simultaneous observations between 428 nm and 670 nm or 558 nm and 670 nm are performed with a time resolution of 1 sec and a spatial resolution at a tangential point of ~4 km, respectively. According to the noon-midnight sun-synchronous orbit of Reimei at an altitude of ~640 km, the observation is made around the midnight sector.

From the preliminary analysis of MAC data obtained at ~1913 UT on Apr. 15, 2008, it is found that the vertical profile of O 558 nm shows the maximum (~4kR) at an altitude of 95 km, and that the second peak (0.3 kR) is also seen at an altitude of ~220 km suggesting the existence of different emission process in the F-region. The peak of OH 670 nm emission intensity is ~2kR. Considering that the filter bandwidth of 670 nm is 38 nm, the OH band intensity is estimated to be 53 R/nm on average. We will estimate the volume emission rate by using these observed vertical profiles. In addition, we found the sprite event at 1915:49.19 UT in this path. It is expected that electron energy of sprites is estimated using simultaneous imaging data at N2+ 1NG 428nm and at N2 1PG 670 nm. In this presentation, recent results of airglow and sprites observations at low-latitudes by Reimei will be presented.