

オーロラ微細構造のれいめい衛星-地上同時観測

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Coordinated Reimei and ground-based observations of fine-scale aurora

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Fine-scale auroral dynamics have been examined by using a multi-spectral auroral camera (MAC) and particle sensors (ESA/ISA) on board the Reimei satellite with a sun-synchronous orbit at an altitude of 610x670 km and at 1250/0050 local time. MAC observes three auroral emissions, 428 nm (N₂⁺ 1N), 558 nm(OI) and 670 (N₂ 1P), with time and spatial resolutions of 120 ms and 1km/pix, respectively. ESA/ISA observes electron/ion energy spectrum in the range of 10 eV/q - 12 keV/q with a time resolution of 40 ms.

To investigate the fine-scale auroral dynamics and their relationship to the large-scale aurora, coordinated Reimei and ground-based observations have been carried out in northern and southern hemispheres. In this talk we concentrate the results obtained from simultaneous observations between Reimei, and THEMIS ground-based observatories (GBOs), and between Reimei and Syowa station, Antarctica.

THEMIS GBOs are ground-based all-sky imager (ASI) and magnetometer network distributed in the wide range of Canada and Alaska. During the winter periods of 2005/2006 and 2006/2007, we find 105 and 147 cases, respectively, when the Reimei footprint was less than 200 km away from any one of the THEMIS GBOs and all instruments (Reimei MAC, Reimei ESA/ISA, and GBO ASI) were operating simultaneously. Among these cases in the period of 2006/2007, 29 cases under conditions of clear sky and appearance of aurora are found. Using the ASI data, we have recognized the time and spatial variations of auroral distributions in the region out of MAC field-of view. The degradation of auroral structure seen with ASI is quantitatively estimated by comparing auroral image profiles obtained by REIMEI MAC and THEMIS GBOs.

Recently, data downlink of Reimei started at Syowa Station, and opportunity of observation in the southern hemisphere has been increased in the winter of 2007. During the period from 2005 Oct 1 to 2006 June 10, we find 9 cases when the Reimei footprint was less than 200 km away from Syowa all instruments were operating. In this presentation, recent results of coordinated observations between Reimei and Syowa will also be given.