

Reimei and THEMIS GBO simultaneous observations of auroral emissions and particle precipitations during substorms

Masatomo Harada[1]; Yukinaga Miyashita[2]; Kazushi Asamura[2]; Masafumi Hirahara[3]; Takeshi Sakanoi[4]; Yusuke Ebihara[5]; Vassilis Angelopoulos[6]; S.B. Mende[7]; H.U. Frey[7]; Erick Donovan[8]; Brian Jackel[9]; Ian R. Mann[10]; Christopher T. Russell[11]

[1] Earth and Planetary Science, Tokyo Univ.; [2] ISAS/JAXA; [3] Dept. Earth & Planet. Sci, Univ. Tokyo; [4] PPARC, Grad. School of Sci., Tohoku Univ.; [5] Nagoya Univ., IAR; [6] SSL, UC Berkeley; [7] U.C. Berkeley; [8] Astronomy and Physics, University of Calgary; [9] U of Calgary; [10] Dept Physics, Univ Alberta; [11] IGPP/UCLA

We have studied auroral emissions and particle precipitations during substorms on the basis of simultaneous observations from the Reimei satellite and the THEMIS Ground-Based Observatories (GBOs). Reimei, orbiting Earth at an altitude of 610 to 660 km, carries the Multi-spectral Auroral imaging Camera (MAC) and the Electron/Ion Spectrum Analyzer (ESA/ISA). The THEMIS GBOs are ground-based stations broadly deployed in Canada and Alaska with All-Sky Imagers (ASIs) and magnetometers. It is very difficult to identify the substorm phases and locations only by the Reimei MAC, because of its narrow field of view (FOV) (~70 km x 70 km). On the other hand, THEMIS GBO ASIs and magnetometers provide global images of auroras and geomagnetic disturbances, respectively, to determine the substorm phases and locations. During 2006 and 2007, especially in winter, there were several events in which Reimei passed over the THEMIS GBOs, and both Reimei MAC auroral image and ESA/ISA particle data were available for substorms identified from THEMIS GBO data. In the present study, we quantitatively analyzed the Reimei data for precipitating particles and auroral emissions. We show characteristics of the precipitating electrons and the auroral emissions during the substorms. We also discuss these events from the viewpoint of magnetosphere-ionosphere coupling.