Observation of relativistic electron loss induced by EMIC waves: Arase and PWING induction magnetometer array collaboration

Satoshi Kurita[1]; Yoshizumi Miyoshi[1]; Kazuo Shiokawa[2]; Nana Higashio[3]; Takefumi Mitani[4]; Takeshi Takashima[5]; Ayako Matsuoka[6]; Mariko Teramoto[7]; Iku Shinohara[8]
[1] ISEE, Nagoya Univ.; [2] ISEE, Nagoya Univ.; [3] JAXA; [4] ISAS/JAXA; [5] ISAS, JAXA; [6] ISAS/JAXA; [7] ISEE, Nagoya University; [8] ISAS/JAXA

EMIC waves are generated by temperature anisotropy of energetic ions near the magnetic equator and satellite observations show that the waves tend to be observed on the dusk side and noon side magnetosphere. EMIC waves can propagate from the magnetosphere to the ground and they are observed by ground-based magnetometers as Pc1 pulsation. It has been pointed out that EMIC waves can resonate with relativistic electrons through anomalous cyclotron resonance, and cause strong pitch angle scattering of radiation belt electrons. It has been considered that precipitation loss of relativistic electrons by pitch angle scattering induced by EMIC waves is an important loss mechanism of radiation belt electrons. We report on the observation of relativistic electron loss observed by the Arase satellite on the dawn side magnetosphere during a geomagnetic disturbance, which is likely to be related to an EMIC wave activity. During the event, the EMIC wave activity in conjunction with the relativistic electron loss is identified from observation by the ground-based induction magnetometer array deployed by the PWING project. The magnetometer array observation reveals that EMIC waves are distributed in the wide magnetic local time range from the dusk to midnight sector. It is suggested that drifting relativistic electrons are scattered into the loss cone by the EMIC waves on the dusk to midnight sector before they arrive at the Arase satellite located on the dawn side. We will discuss the impact of loss caused by EMIC wave-induced precipitations on the overall flux variation of radiation belt electrons during the geomagnetic disturbance.