R006-44
Zoom meeting B ：11/3 AM1 (9:00-10:30)
09:00-09:15

Simulation on rapid flux change of energetic electrons in the upper-band whistler burst event observed by Arase

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The Medium Energy Particle Experiment-electron analyzer (MEP-e) onboard The Arase satellite detected a rapid flux change of a few tens keV electrons close to the magnetic equator. At the same time, an upper-band whistler chorus burst was also detected by the Onboard Frequency Analyzer (OFA) of the Plasma Wave Experiment (PWE) instrument in about 30 seconds. Kurita et al. (2018) studied the event and concluded that quasi-linear diffusion processes do not explain such a rapid flux enhancement of electrons. In order to verify the electron scattering observed in the event, we have performed a test-particle simulation to calculate electron scattering by whistler mode waves propagating along a magnetic field line. The simulation imported the wave spectrum observed by OFA/PWE and the initial electron flux distribution observed by MEP-e. The simulation results show that the flux of electrons with an energy of 24.5 keV and pitch angles of 70-80 degrees noticeably increases in 30 seconds, which is consistent with the Arase observations during the event. The simulation also shows that the electrons contributing to the flux enhancement are transported from those with pitch angles less than 50 degree and energies lower than 15 keV. We confirm that a quasi-linear diffusion theory cannot reproduce such a rapid change of pitch angle and energy. Our simulation concludes that the rapid flux enhancement observed by Arase is due to electron transport driven by electron cyclotron resonance lasting for over a few tens milli-seconds rather than quasi-linear diffusion.