太陽風動圧変化時の外帯電子加速に関するシミュレーション

三好 由純 [1]; 齊藤 慎司 [2]; 松本 洋介 [3]; 関 華奈子 [1]; 天野 孝伸 [4]
[1] 名大 STE 研; [2] 情報通信研究機構; [3] 千葉大理; [4] 東大

Simulation study on rapid energization of relativistic electrons associated with the pressure pulse

Yoshizumi Miyoshi[1]; Shinji Saito[2]; Yosuke Matsumoto[3]; Kanako Seki[1]; Takanobu Amano[4]
[1] STEL, Nagoya Univ.; [2] NICT; [3] Chiba University; [4] Univ. Tokyo

During the solar wind pressure pulse, ULF Pc5 waves are excited in the inner magnetosphere and the flux of the relativistic electrons of the outer belt are strongly modulated associated with the ULF waves. In order to investigate variations of the relativistic electrons, we conduct the code-coupling simulations of GEMSIS-RB test particle simulation [Saito et al., 2010] and GEMSIS-GM global MHD simulation [Matsumoto et al., 2010]. The GEMSIS-RB simulation calculates the 3-dimentional guiding-center motion of a number of test particles in the electric/magnetic fields provided from the GEMSIS-GM. Different from previous code coupling simulations studies of test-particle with global-MHD, we can calculate the off-equatorial particles and can trance the complicate trajectories such as the drift-shell bifurcations at the dayside. After the arrival of the pressure pulse, the outer belt electrons in the dayside moves inward due to the inductive electric fields. Some of electrons are lost due to the magnetopause shadowing. Since the acceleration region is limited in the dayside, electrons at night-side do not experience significant accelerations. These unsymmetrical accelerations produce the spiral structures of the electron distribution, which is evidence of the drift-resonance. The electron distributions spread in the radial directions at ˜20 min. after the pressure pulse, which seems to be a signature of the radial diffusion due to the fluctuation of electric/magnetic fields in the inner magnetosphere.