[EE] Evening Poster | P (Space and Planetary Sciences) | P-EM Solar-Terrestrial Sciences, Space Electromagnetism & Space Environment

[P-EM16]Dynamics of Earth's Inner Magnetosphere and Initial Results from Arase

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Earth's inner magnetosphere is a fascinating source of space research problems. There remain many fundamental questions concerning the physics of the radiation belts, the ring current, the plasmasphere and the ionosphere. The JAXA spacecraft Arase(ERG) was successfully launched in December 2016, and has since been providing excellent data on waves, particles and fields over a range of L-shells in the inner magnetosphere. This session particularly welcome submissions related to the Arase mission. As well, data from other recent missions to the magnetosphere are also welcome, including the Van Allen Probes, MMS, and THEMIS. Topics of interest include charged particle interactions with the predominant electromagnetic wave modes such as whistler-mode chorus and hiss, ion cyclotron waves, magnetosonic waves, and ULF waves. Projects involving the prevailing issues of particle acceleration and loss, and particle transport are also of interest. In addition, projects involving the coupling of plasma populations in the inner magnetosphere are also timely. Studies involving observations, simulations, theory and modeling are all invited.

[PEM16-P21]Flux decrease of outer radiation belt electrons associated with solar wind pressure pulse: A Code coupling simulation of GEMSIS-RB and GEMSIS-GM

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Relativistic electron flux of the outer radiation belt dynamically changes in response to solar wind variations. There exist several conditions to cause the flux drop-out of outer belt electrons. The magnetopause shadowing (MPS) is one of the process to cause the rapid loss of outer belt electrons (e.g.,Kim et al.,2008). In this study, we performed a code-coupling simulation using GEMSIS-RB test particle simulation code (Saito et al., 2010) and GEMSIS-GM global MHD magnetosphere simulation code (Matsumoto et al., 2010) to specify which electrons of the outer belt will be lost due to the MPS, by investigating pitch angle and MLT dependences. We calculated the guiding center equation of each particle with initial L-shells 7.5 Re to 9.0 Re, energies 300 keV to 3 MeV and pitch angles 60 degrees to 120 degrees. The initial dynamic pressure of the solar wind is 1.0 nPa. The standoff distance of magnetopause at the subsolar point was 12 Re as an initial state. The magnetopause moved to 9 Re due to the dynamic pressure enhancement when the solar wind pressure became 2.5 nPa. After the enhancement of the dynamic pressure for 40 sec, the L-values of the magnetopause moved back to 10 Re due to the dynamic pressure decrease. We found that electron flux decreased during the period, which strongly depended on MLT and pitch angle of electrons. The simulation showed that more than 80% of lost electrons lost from the magnetopause at 8 ~ 11 MLT. The pitch angles of 90% of lost electrons are

85 ~ 95 degrees. Because the MPS process causes loss of electrons at L values higher than 6.75, it is suggested that other loss processes are necessary for the loss at lower L-values. After the MPS, the electron fluxes at lower L-shells decreased through outward motion of trapped electrons due to E x B drift. Our simulation results suggest that the dominant loss processes of electron flux in the MPS at L >6.75, while the outward motion at L <6.75.