

[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-P13] Statistical Analysis of EMIC Waves Observed by Plasma Wave Experiment (PWE) aboard Arase

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The wave-particle interaction process has an important role for the electron acceleration and loss in the terrestrial inner magnetosphere. Particularly, the significant loss of relativistic electron and energetic ion precipitation due to electromagnetic ion cyclotron (EMIC) waves is a remarkable process. Statistical analyses of EMIC waves around radiation belts have been performed by using data obtained by the Van Allen probes, and they clarified local time dependence of EMIC waves in the inner magnetosphere. The Arase satellite was launched on December 20, 2016 to understand dynamics around the Van Allen radiation belt such as particle acceleration, loss mechanisms, and the dynamic evolution of space storms in the context of cross-energy and cross-regional coupling. The Plasma Wave Experiment (PWE) is one of the scientific instruments onboard the Arase satellite and measures the electric field and magnetic field in the inner magnetosphere. A great advantage of Arase's observation is its latitudinal coverage. Because the orbital inclination of Arase is 31 degrees, the satellite has many chances to observe not only around the geomagnetic equatorial region but around mid-latitude region. We successfully obtained 166 EMIC waves during first 9 months after the satellite was launched. We found that 37% of observed EMIC waves obtained by the PWE has such fine structures. Our statistical analyses showed that the spatial distributions of the unstructured EMIC waves and that of the fine-structured EMIC waves were greatly different. Occurrence probability of the fine-structured EMIC waves had a clear peak around noon. We also showed the spatial distribution of the fine-structured EMIC waves, and found that they were observed around a specified L-shell (approximately L=3-4). The wide latitudinal coverage of Arase's orbit enabled this unique analysis.