[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

convener:Danny Summers(Memorial University of Newfoundland), Yoshizumi Miyoshi(Institute for Space-Earth Environmental Research, Nagoya University), Keisuke Hosokawa(電気通信大学大学院情報理工学研究科, 共同), Yusuke Ebihara(Research Institute for Sustainable Humanosphere, Kyoto University)
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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-P16]Statistical study of selective transport of higher-energy oxygen ions into the inner magnetosphere during geomagnetic storms observed by Van Allen Probes

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It is recently reported that the transport mechanism of the ring current ions differs among ion energies. Lower-energy (<~150 keV) ions are well known to be transported convectively. Higher-energy (>~150 keV) protons are reported to be transported diffusively, while there are few reports about transport of higher-energy oxygen ions. Selective transport of higher-energy ring current oxygen ions was detected during the storm main phase on 24 April 2013 by the Van Allen Probes spacecraft. An enhancement of 1-100 mHz magnetic fluctuations is simultaneously observed. Observations of 3 and 30 mHz geomagnetic pulsations indicate the azimuthal mode number is <~10. The fluctuations can resonate with the drift and bounce motions of the oxygen ions. The results suggest that the combination of the drift and drift-bounce resonances is responsible for the radial transport of higher-energy oxygen ions. To understand occurrence conditions of the selective transport of the higher-energy oxygen ions, we investigate all magnetic storms observed by Van Allen Probes from February 2013 to September 2017. We calculated ion PSDs for various first adiabatic invariants (mu=0.1-2.0 keV/nT) and for the local pitch angles near 90 degrees. Comparing mu-L diagrams of PSDs between neighboring orbits of Van Allen Probes during a storm, we detect >3 times enhancement of oxygen ion PSDs without no enhancement of proton PSDs

throughout >0.5 RE L-shell band. We regard the selective enhancement of higher-energy oxygen ions as selective transport of higer-energy oxygen ions. We found similar events during the 28 magnetic storms out of 89 magnetic storms. The higher-energy oxygen ions are transported deeper when the maximum of the AE index in 9 hours (~orbital cadence of Van Allen Probes) before the detection of selective transport is larger. We also investigate global distributions of magnetic fluctuations during magnetic storms observed by Van Allen Probes, THEMIS, GOES, and ground magnetometers. We discuss about correlation between selective transport of higher-energy oxygen ions and enhancement of magnetic fluctuations.