[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-P11]Study of longitudinal extent of magnetospheric ELF/VLF waves using three PWING ground stations at subauroral latitudes

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ELF/VLF waves are generated by electron temperature anisotropy in the equatorial plane of the magnetosphere, and propagate to the ground along geomagnetic field lines. The waves interact with electrons drifting longitudinally in the inner magnetosphere, and help accelerating them to relativistic energies. However the instantaneous longitudinal distribution of these waves has not been well understood. Yonezu et al. (JGR, 2017) investigated global extent of magnetospheric ELF/VLF waves by using simultaneous observations at three ground stations in auroral and subauroral latitudes at Athabasca (Canada), Kannuslehto (Finland) and Syowa Station (Antarctica). In the present analysis, we investigate local-time extent of the waves by using simultaneous observations at three stations with a magnetic local time separation of 2.5 hours at subauroral latitudes at Athabasca (ATH; 54.7N, 246.4E, MLAT: 61.3N), Kapuskasing (KAP; 49.4N, 277.8E, MLAT: 58.7N) in Canada and Gakona (GAK; 62.4N, 214.8E, MLAT: 63.6N) in Alaska. These stations use the same receiver antennas operated and installed under the PWING (study of dynamical variation of Particles and Waves in the INner magnetosphere using Ground-based network observations) project. Using these antennas with same specifications, we could obtain wave spectra of the same quality except for the local noise. We used two pairs of stations (ATH-KAP and ATH-GAK) for the analysis. The periods of investigation at ATH-KAP simultaneous observation and ATH-GAK simultaneous observation are from December 11, 2016 to May 8, 2017 (a total of 180 days) and from October 1, 2017 to November 30, 2017 (a total of 60 days), respectively. We investigated appearance of magnetospheric ELF/VLF waves every 10 minutes in the wave

spectra at 0-10 kHz. The occurrence rates of ELF/VLF waves at ATH, GAK, and KAP are 16.4–21.7%, 20.6% and 8.9%, respectively. The rates of ELF/VLF waves simultaneously observed at two stations for ATH-KAP and ATH-GAK pairs are only 4.0% and 8.9%, respectively. We defined the longitudinal extent of the ELF/VLF waves by dividing the period when waves were simultaneously observed at two stations by the period when waves were observed each station. The estimated longitudinal extent for ATH-KAP and ATH-GAK are ~20-40% and 40%, respectively. These values indicate that the ELF/VLF waves are localized in longitudes compared with the longitudinal extent of high-energy electrons drifting in the dawn sector. The longitudinal extent of ELF/VLF waves becomes maximum in the morning sector and minimum in the dusk-premidnight sector. In the presentation, we report more detailed characteristics of the longitudinal extent of ELF/VLF waves and results of statistical analysis of simultaneous observation at three stations and discuss their implication on the plasma dynamics of the inner magnetosphere.