International Session (Oral) | Symbol P (Space and Planetary Sciences) | P-EM Solar-Terrestrial Sciences, Space Electromagnetism & Space Environment

[P-EM04_28PM2]New Perspectives on Earth's Inner Magnetosphere

Convener:*Danny Summers(Dept of Math and Stats,Memorial University of Newfoundland), Yusuke Ebihara(Research Institute for Sustainable Humanosphere, Kyoto University), Yoshizumi Miyoshi(Solar-Terrestrial Environement Laboratory, Nagoya University), Chair:Yoshizumi Miyoshi(Solar-Terrestrial Environement Laboratory, Nagoya University)

Mon. Apr 28, 2014 4:15 PM - 6:00 PM 311 (3F)

Earth's inner magnetosphere is a complex, dynamic plasma environment which includes the radiation belts, ion/electron ring current, plasmasphere, and ionosphere at auroral/sub-auroral latitudes. This session invites papers on all facets of inner magnetosphere research, including recent observations from space and ground, simulations, modeling and theory. Reports of particle, wave, and field data from the Van Allen Probes are particularly welcome, in addition to observations from other satellite missions such as THEMIS, POES, Cluster, and Akebono as well as ground-based facilities such as SuperDARN and magnetometers. Papers related to the planned JAXA mission ERG are also especially encouraged. The ERG satellite, with an expected launch in 2015-2016, will explore in particular how relativistic electrons are generated in the inner magnetosphere during disturbed geomagnetic conditions. Both science-related and instrument-related papers on ERG are solicited, including ground-based observations and simulations. Recent advances in the analysis of magnetospheric wave-particle interactions via particle simulations and nonlinear theory are also welcome.

5:45 PM - 6:00 PM

[PEM04-P02_PG]Solar-cycle variation of the plasmasphere observed from the Akebono PWS data

3-min talk in an oral session

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Plasmaspheric density structures have been studied for a long time. Although it has been clarified that the density is roughly constant along field lines in the outer plasmasphere, field-aligned density distributions of the inner plasmasphere has not been studied intensively. Moreover, continuous observations longer than one-solar cycle have not been reported. Consequently, long-term variations of the plasmaspheric density over a solar cycle remain unknown. In this study, using electron density data based on plasma wave observations from the PWS experiments on board the Akebono satellite from 1989 to 2008, we conduct statistical analyses on variations of structures of the plasmasphere and plasmatrough. In order to investigate the latitudinal distribution of the electron density, we assumed that electron density distribution along field lines are described by a power law form $N_e = N_{e0}(LR_E/R)^{\alpha}$, where N_{e0} is the equatorial electron density. Using the dataset during geomagnetically quiet periods and altitude higher than 4000 km, we derived solar cycle variations of the equatorial density N_{e0} and field-aligned density distributions α. N_{e0} and α are almost constant for the solar cycle ($N_{e0} \approx 2000$ cm^{-3} and α = 0–1) in the inner plasmasphere at L = 2.1–2.3, which distribution is close to diffusive equilibrium. In contrast, $N_{e0} \sim 200$ cm^{-3} and α=0–1 at solar minimum which distribution is close to diffusive equilibrium and $N_{e0} \sim 30$ cm^{-3} and α= 2–3 at the solar maximum which distribution is close to collisionless in the outer plasmasphere at L = 4.2–4.7.