Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

PEM28-P01 Room:Convention Hall Time:May 27 18:15-19:30

The estimation of the altitude of auroral emission from grand-based multiple optical observation

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It is known that precipitation of relatively high energy (greater than 10 keV) electrons produce pulsating aurora. However, precise characteristics of precipitating electrons producing pulsating aurora, such as the local time dependence of their energy, and small-scale distribution within a patch (˜100 km horizontal scale) are not understood well. Ground-based optical triangulation is useful to estimate the auroral height, which is responsible to the energy of precipitating electrons.

In this study, we analyzed the data of N2+428nm auroral emission that obtained with ground-based all-sky EMCCD cameras at three stations in north Scandinavia (Kilpisjarvi, Abisko and Tromso), for the pulsating auroral event during 26th February, 2014 to estimate the pulsating auroral height using the triangulation method.

We chose an auroral patch which is seen correspondence each other visually and positioned near the center the field of the view of the EMCCD camera. We used data in range where is in the latitude of 68-69 degrees north and the longitude of 20-24 degrees east in this analysis to analysis data in area surrounded auroral patch. Then, we gained relatively auroral intensity distribution to divide intensity at each point by average of intensity in that data selected.

To obtain the distribution between two point, we did subtraction of relatively intensity at two points . And same steps were conducted for other patterns. We calculated the distribution by changing the altitude at intervals of 2km. When the distribution was the minimum value, it was the auroral height.

We estimated that auroral height is 98˜104km in this case. This height was in range of the tick electron density zone (about 90-120km) observed EISCAT simulataneously. Compared with past studies, this result is said that it is consistency value and the precipitation electron may have ˜10keV.

In this presentation, we report these result of estimation and discuss them.

Keywords: pulsating aurora, altitude of auroral emission, grand-based multiple observation

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PEM28-P02 Room:Convention Hall Time:May 27 18:15-19:30

Postnoon aurora spot and poleward-drifting multiple arcs

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To understand when and how the postnoon aurora spot is created, we examined data from the all-sky imager installed in Longyearbyen, Svalbard. From the detailed examination of the data obtained during two winter seasons (2013-2014, and 2014-2015), we have found that the postnoon aurora spot consists of poleward-drifting multiple arcs, which happened at intervals of about 2 min. In some events, each poleward-drifting arc distorts into a folding structure at the final stage of the poleward drift, and becomes even brighter. We report the characteristics of the occurrence and motion of the poleward-drifting arcs, and discuss what is important for the creation of the postnoon aurora spot.

Keywords: High-latitude ionosphere, postnoon aurora spot, auroral arc, all-sky imager

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PEM28-P03 Room:Convention Hall Time:May 27 18:15-19:30

Variability in the open magnetic flux during superstorms

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We report temporal variation of open magnetic flux of the polar cap during the superstorm on 11/20/2003 by using in-situ measurements made by DMSP spacecraft and remote-sensing measurements made by TIMED spacecraft. We examined how the shape of the poleward boundary of the auroral oval changed. Our result shows that the poleward boundary is extremely distorted in the morning sector during the main phase of the superstorm. In the expanding/contracting polar cap paradigm, this sector is not regarded as an important element. We discuss some significant points that are not included in that conventional paradigm.

Keywords: Polar cap, magnetic flux, superstorm

Japan Geoscience Union Meeting 2015
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PEM28-P04 Room:Convention Hall Time:May 27 18:15-19:30

Estimation of Plasma Condition Before 1970 Using Digitized Data Created by Tracing Analog Magnetograms

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It is important to know the plasma mass density in the magnetosphere, since it controls the Alfven velocity, which is one of fundamental parameters for the magnetospheric phenomena. We can estimate indirectly the plasma mass density from geomagnetic pulsations, e.g., Pc3 or Pc4. But no digital data of the geomagnetic field with a time resolution of 1.0 second exists before the middle of 1980s. There is also no available satellite data of magnetospheric ion mass density before 1970. The ion composition in the magnetosphere before 1970, therefore, remains unclear.

Mashiko et al. [2013] has developed a program to convert analog magnetograms to digital values with a time resolution of 7.5-seconds, and it makes possible to study various geomagnetic pulsations. According to statistical analysis by Nose [2010], Pi2 periods are represented by the following empirical equation:

$$T = 17.65\ [\pm 0.80] \times M(\mathrm{amu}) - 1.34\ [\pm 0.05] \times \sum \mathrm{Kp} + 108.68\ [\pm 0.94]$$

where T and M represent the Pi2 period and the average plasma ion mass, respectively. From this equation, we can estimate the average plasma ion mass (M) in the nightside plasmasphere when we obtain T and $\sum$ Kp.

From 7.5-seconds digital data created from analog magnetograms for 1964-1975, we estimate the average plasma ion mass in the nightside plasmasphere during solar cycle 20. We perform statistical analysis and compare the estimated average plasma ion mass with F10.7 on long-term basis so that we investigate how solar activities affect on the plasmasphere.

We find that the correlation coefficient (C.C.) between monthly average plasma ion mass and monthly F10.7 is 0.500, while that between monthly average plasma ion mass and monthly $\sum$ Kp is 0.154. In order to consider long-term variations and increase statistical significance, we also calculate correlation coefficients between moving average of these parameters with a time window of 1 year. We find that C.C. = 0.838 between the mass and F10.7, and C.C. = 0.372 between the mass and $\sum$ Kp. This shows that long-term variations of the average plasma ion mass, in particularly, in the time scale longer than 1 year, have stronger correlations with F10.7 than $\sum$ Kp. It is noteworthy that during solar cycle 20, which has smaller maximum of F10.7 than other vicinity cycles, the estimated average plasma ion mass has smaller maximum value than other cycles.

One of the causes of variations in the magnetospheric plasma ion composition is upflowing ionospheric ions. The ionospheric ion upflow is enhanced by solar radiation such as ultraviolet radiation (UV) or extra ultraviolet radiation (EUV), and geomagnetic activities such as precipitation of energetic particles or aurora electrojet. Here we study the dependence of average plasma ion mass on F10.7 and $\sum$ Kp, and find the strong correlation with F10.7. This result suggests that in long-term variations, solar radiation is dominant mechanism to produce or heat oxygen ions.

Keywords: Pi2 pulsations, analog magnetogram, average plasma ion mass, plasmasphere, solar activity, upflowing ionospheric ions

PEM28-P05 Room:Convention Hall Time:May 27 18:15-19:30

Ionospheric currents induced by Dst field and their effects on the geomagnetic field variation

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Ionospheric currents induced by Dst field were simulated, and their effects on the geomagnetic field variation was estimate. It was found that a vortex current system is induced in the dayside ionosphere for the variation of less than 10 minutes because of the lower nighttime conductivity, and causes geomagnetic field variation in the Y-component.

Keywords: Dst field, induced ionospheric currents, geomagnetic field variation

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PEM28-P06 Room:Convention Hall Time:May 27 18:15-19:30

CubeSat Project for the observation of Sq current at extreme low altitude

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It is well known that Sq (Solar quiet) current in the dayside ionosphere has been considered as a significant subsequence of Mesosphere-Ionosphere-Magnetosphere coupling. The intensity and the pattern of the Sq current often vary due to the magnetospheric disturbances such as magnetic storms and substorms while the fundamental pattern of the current is determined by the global distribution of the tidal wind flowing in the mesosphere. The study of the Sq current has been conducted by many investigators from various view points of the M-I-M coupling. In particular, the north-south asymmetry of the potential has been focused in terms of the energy balance between each hemisphere through the field line. In order to explain this potential asymmetry, an InterHemispheric Field Aligned Current (IHFAC) was theoretically predicted by *Maeda* [1974] and Fukushima [1979, 1991]. After that the ground magnetic observations supported such idea [*Takeda* 1990; *Stening* 1989; *Fukushima* 1994]. However the detailed morphology of the IHFAC is not well understood yet, despite that the direct detection of the IHFAC at Low Earth Orbit (LEO) was reported in the observation by the Ørsted satellite [*Yamashita* and *Iyemori*, 2002] and the CHAMP satellite [*Park et al*., 2011].

We think that the in-situ satellite observation in the lower altitude and the smaller inclination compared to the Ørsted (Altitude=760km, Inc.=97deg.) and the CHAMP (Altitude=454km, Inc.=87deg.) can be an efficient approach to reveal the morphology of the Sq current. In order to investigate the electromagnetic M-I-M coupling of the Sq current system including the IHFAC, the in-situ observation by a CubeSat (2U or 3U size satellite emitted from ISS) just above the coupling region closed to the foot print of IHFAC with the altitude of less than 400km (F region in the ionosphere) is planned in collaboration with 8 national colleges which belong to National Institute of Technology (KOSEN). The fluxgate magnetometer and the impedance probe are considered to be installed in the satellite to observe the small perturbation of the magnetic field and the electron density.After the ejection from the ISS, the CubeSat will gradually glide down to the upper atmosphere due to the strong atmospheric drag and finally burn up in it. The duration of the possible observation is estimated for more than 50 days. Such an extremely low cost satellite enables to conduct the observation in the lowest altitude where the conventional satellite cannot be operated because of a low cost-effectiveness.

Keywords: Sq current, Inter-hemispheric FAC, CubeSat

PEM28-P07 Room:Convention Hall Time:May 27 18:15-19:30

Verification of proto-flight models of Medium Energy Particle analysers (MEPs) for ERG

KASAHARA, Satoshi[1*] ; YOKOTA, Shoichiro[1] ; MITANI, Takefumi[1] ; ASAMURA, Kazushi[1] ; TAKASHIMA, Takeshi[1] ; HIRAHARA, Masafumi[2] ; SHIMOYAMA, Manabu[2]

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ERG (Exploration of energization and Radiation in Geospace) is geospace exploration spacecraft, which is planned to be launched in FY2016. The mission goal is to understand the radiation belt dynamics especially during space storms. The key of this mission is the observations of electrons and ions in medium-energy range (10-200 keV), since these particles excite various electromagnetic waves (e.g., EMIC waves, magnetosonic waves, and whistler waves), which are believed to play significant roles in the relativistic electron acceleration and loss. Proto-flight models (PFMs) of the medium-energy electron analyser and ion mass spectrometer have been fabricated and their performance tests are started. We report these initial results.

PEM28-P08 Room:Convention Hall Time:May 27 18:15-19:30

Development of stacked silicon strip detectors for MeV electron on board the Geospace exploration satellite “ERG”

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The Energization and Radiation in Geospace (ERG) project will explore how relativistic electrons in the radiation belts are generated during space storms. “High energy particle (electron)” instrument (HEP-e) on board ERG satellite will measures 3-D distribution of high energy electron between 70 keV and 2 MeV. In high resolution mode, HEP-e measures the energy and incident direction of each electron with time resolution of 2 μsec.

The detection parts of HEP-e are six pinhole cameras which consist of mechanical collimators, silicon semiconductor detectors and readout ASICs. Three camera measure electrons with energy of 70 keV - 1 MeV and other three with energy of 700 keV - 2 MeV.

The flight model of HEP-e is under manufacture and the verification tests before integration are ongoing. In this presentation we introduce HEP-e instrument and report results of the step-by-step verification tests of each component before final assembly.

Keywords: ERG, silicon semiconductor detector, electron acceleration

PEM28-P09 Room:Convention Hall Time:May 27 18:15-19:30

Performance evaluation of the fluxgate magnetometer installed on the ERG satellite

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We conducted the performance evaluation tests on 5-8 November 2014, on the fluxgate magnetometer (MGF) being installed on the ERG satellite. The MGF is required to have the accuracy of 5nT (0.03%) with a 8000nT range when it measures the magnetic field in the Earth's inner magnetosphere. In order to evaluate its measurement accuracy, we investigated the in/output linearity of ADC by comparing the digital outputs to the continuous input voltage (~0-±3V). We also investigated the ADC noise dependence on the analog input voltage for 30s digital outputs every 0.15V inputs from ~0 to ±3V.

The MGF measures the magnetic field by returning feedback currents into the sensor. It required to evaluate the time delay of responses to the magnetic field variation and the maximum magnetic field variation which the MGF can response. We derived the time delay with the correlation analysis between the input voltage (10Hz sin waves with ~±4000nT amplitudes) and the digital outputs. We also investigated the maximum frequency of the magnetic field variation by adding large amplitude (1-4V) sine waves (9-36Hz).

In our presentation, we report those performance evaluation results.

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Statistical study of the magnetic storm phase dependence of the inner boundary of the plasma sheet electrons

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The locations of inner boundary of the plasma sheet electrons during magnetic storm have been analyzed statistically by using THEMIS data. Plasma sheet electrons are carried to the earth due to magnetospheric convection, and then drift toward the morning sector in the vicinity of the earth. Thus, the inner boundary of the plasma sheet electrons is formed around 3 - 7 R_E. In addition, plasma sheet electrons can precipitate along a magnetic field line, and produce aurora in the earth's ionosphere.

Previous studies investigated the dependence of the location of the inner boundary of the plasma sheet electrons on geomagnetic indices such as Kp and AE index [Korth et al., 1999; Jiang et al., 2011]. Jiang et al. [2011] reported the local time distribution of the inner boundary of the plasma sheet electrons in both quiet and disturbed conditions by referring AE index. In this study, we focus not only on dependences on Dst index but also on dependences on phase of magnetic storms. The data which we used are obtained by ESA (Electrostatic Analyzer) onboard the THEMIS satellite. ESA measures the energy flux, density and temperature of particles over the energy range from a few eV to 30 keV for electrons and to 25 keV for ions. In the present study, we use ESA data of 1 to 10 keV electrons. We perform analyses of events during two magnetic storms on July 6, 2013 and June 17, 2012. We also perform a statistical analysis of the positions of inner boundary of the plasma sheet electrons.

Event analyses indicates that the inner boundaries were located around 3 - 4 R_E and 4 - 10 R_E in the main phase and the recovery phase of the magnetic storm, respectively. We find that the boundaries are closer to the earth in the main phase than those identified during the recovery phase of the same magnetic storm. In addition, we find in the main phase of the magnetic storm that the identified inner boundaries of the plasma sheet electrons with energy from 0.7 to 9 keV are located around the similar radial distance. On the other hand, in the recovery phase of the magnetic storm, we find that the inner edge of the low energy electron (~1keV) is closer to the earth than that of the high energy electron (~9eV). In the magnetic storm of June 17, 2012, the recovery phase continued for two days. The inner boundary of the plasma sheet electrons was at 3.9 R_E in the first day and 6.1 RE in the second day. The difference between L of 1 keV electrons and that of 9 keV is 1.4 in the first day and 3.7 in the second day, so the energy dependence of the location of the inner boundary of the plasma sheet electrons becomes more evident in the second day than in the first day.

The result of our statistical study shows the similar energy dependences in the recovery phase of small magnetic storms but different tendency in the main phase of the magnetic storm. We also reveal that the typical radial distance of the inner boundary during the storm main phase is 3.9 R_E. Disappearance of the energy dependence of the location of the plasma sheet electrons (the difference between L of 1 keV electrons and that of 9 keV is less than 0.6) suggests the presence of the strong electric field in the vicinity of the earth. Finally, we compared the locations of the inner edge of the plasma sheet electrons obtained by ESA onboard THEMIS satellite with those estimated based on the steady state drift boundary model proposed by Jiang et al. [2011] and Volland-Stern electric field model . As a result, the model cannot fully explain the observed independence of the positions of the inner edges of the plasma sheet electrons on the kinetic energy of the electrons during magnetic storm, especially in the recovery phase of the magnetic storm. The results suggest that there are some additional electric fields in the inner magnetosphere and further investigations on them will be needed in future.

Keywords: plasma sheet inner edge, plasma sheet, convection electric field, magnetic storm, aurora, substorm

PEM28-P11 Room:Convention Hall Time:May 27 18:15-19:30

Observation of heavy ions from the earth's ionosphere in the plasma sheet

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There are two plasma sources of the plasma sheet in the Earth's magnetotail, i.e., the solar wind and ionospheric outflows. Previous observations have shown that the ionospheric plasma contribution to the plasma sheet depends largely on geomagnetic activities. However, supply mechanism of the ionospheric plasma to the plasma sheet is far from well understood. In order to investigate the fate of ionospheric outflows in the plasma sheet, we have found cold O^{+} and He^{+} beams in the plasma sheet at the distance about 20 Re(Earth radii) in the Geotail LEP data from January 1997 to December 2005. The Energy-time spectrograms of the LEP ion data obtained in the plasma sheet show the signatures of cold heavy ion beams outflowing from the ionosphere. Because the mass analysis data of ion with energies less than 10 keV are not available, we identify ion species by velocity distribution function. The plasmas in the plasma sheet are dominated by the $E \times B$ drift, therefore the plasma bulk velocities perpendicular to the local magnetic field should be equal in spite of the ion species. We survey the differences of the geomagnetic activities for these ion beams in the plasma sheet. The results show that the intense ion beams are frequently observed when the geomagnetic storms occurred. The energy of these cold heavy ion beams is generally less than 10 keV. In this presentation we discuss these statistical tendencies of the cold heavy ion beams in the plasma sheet.

Keywords: magnetosphere, ion outflow, plasma sheet

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PEM28-P12 Room:Convention Hall Time:May 27 18:15-19:30

Geotail observations of dayside magnetopause reconnection I

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On 06 July 2013, Geotail observed the dayside magnetopause reconnection for a long time period. In the period 0000-0800 UT on 06 July 2013, the solar wind has an almost constant speed of 350 km/s and the Interplanetary Magnetic Field (IMF) is almost southward, having a value of (0.0, +4.5, -12.0 nT). Geotail traveled from the magnetosheath to the magnetosphere. The Geotail position is (Xgsm, Ygsm, Zgsm) = (9.72, -2.23, -0.49 Re) at 0400 UT and (8.91, 0.87, -1.73) at 0600 UT, respectively. Geotail stays in the vicinity of the magnetopause, almost in the front magnetosphere. Reconnection jets with a speed of 200 km/s are observed near the reversal of the magnetic field. The reconnection jets flow northward, indicating that the reconnection site is located south of the Geotail position. There are two cases in the magnetic field variations. In most cases, the Bz magnetic field component is dominant and the field reverses from southward to northward in the crossing into the magnetosphere, and the reconnection jets are almost field-aligned. However, the magnetic field becomes almost perpendicular to the north-south direction, and the positive By magnetic field component is dominant. The reconnection jets are convection flows. In this study, the magnetic field topology and its relationship to the jets are investigated.

Keywords: magnetosphere, magnetic reconnection

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Geotail observations of dayside magnetopause reconnection II

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Plasma velocity distributions perpendicular to the magnetic field are generally isotropic by Larmor motion of ions and electrons. In actuality, isotropic velocity distributions are observed by Geotail. However, anisotropic ion velocity distributions were observed in the magnetosheath nearby the magnetopause when Geotail crossed the dayside magnetopause and observed ion flow jets by magnetic reconnection. The Geotail data of ion Energy-Time spectrogram on July 6, 2013 indicate anisotropic velocity distributions of ions energies higher than 20 keV at 0330 UT. The Geotail orbit is from magnetosheath through the magnetopause to the magnetosphere. The spacecraft GSM coordinates at the time of anisotropic ion velocity distribution observation are (9.8, 3.0, -0.2)R_E. This Geotail position is in the magnetosheath nearby the magnetopause. Ion energies are about 1 keV in the distant magnetosheath from the magnetopause. There are no ions with energies higher than 10 keV in the magnetosheath. There are ions with energies higher than 20 keV in magnetosphere. Thus, these ions are considered to go out toward the magnetosheath from the magnetosphere. We explain anisotropic ion velocity distributions by reconnecting magnetic field geometry.

Keywords: magnetosphere, magnetic reconnection

PEM28-P14 Room:Convention Hall Time:May 27 18:15-19:30

Characteristic of the dayside and nightside reconnection region in the Earth's magnetosphere

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We have investigated the magnetic reconnection at the dayside of the magnetosphere (X=0~20 Re) and at the nightside (X=-30~-10 Re) by using Geotail observations. Especially, we concentrate on the dayside magnetic reconnection event that has not been intensively studied compared to the nightside reconnection. In the case of nightside reconnection, the lobe plasma conditions in the northern and southern lobes are generally the same. Therefore, it is expected that the symmetric reconnection will occur. On the other hand, in the case of dayside reconnection, the reconnection mixes different plasmas (magnetosphere and solar wind plasmas). Thus, the asymmetric reconnection will occur in the dayside of the magnetosphere. We chose the reconnection events investigating the occurrence of simultaneous flow and magnetic field reversals by using the Geotail data. Then, we studied the energy exchange between plasma and electric field. The quadrupole structure produced by the Hall effect near the magnetic neutral line by using the magnetic field data is also studied. We analyzed 36 nightside reconnection events. In 13 events, we found that the velocity distribution function of ions shows two-component signature (cold inflow and hot outflow), which is the typical feature observed in the magnetic reconnection region. In addition, we identified 12 ion heating events near the neutral line. In the same way, we analyzed 26 dayside reconnection events. We could not find two-component and heating signatures of ions near the neutral line. The quadrupole magnetic field structure (By, GSM) due to the Hall effect also shows different characteristics between the dayside and nightside reconnection. In the case of dayside reconnection event, only 10 events out of 26 events show the quadrupole signature, and the others had different characteristics from quadrupole. Based on these results, we will discuss the difference between symmetric reconnection and asymmetric reconnection.

Keywords: magnetic reconnection, Hall effect, asymmetry, Geotail spacecraft

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The separation of temporal and spatial fluctuation of magnetic field data obtained by SWARM satellites.

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It is difficult to separate temporal and spatial fluctuation from data obtained by satellites.

Sugiura et al. (1984) suggested that the small-scale magnetic fluctuations over the high-latitude ionosphere are mainly caused by small-scale field aligned currents.We revealed the fact observationally by using the high-time resolution magnetic data from SWARM satellites.

We took correlation coefficients between satellite-A and satellite-B by shifting time (i.e., correlation function) and picked up the peak of them for each time interval used for the calculation. Then we found, sometimes, the value of correlation coefficient without time shifting is larger than that with time shifting. In short, temporal fluctuations are sometimes more dominant than special fluctuations.

To compare with the results obtained by Ishii et al, (1992), we analyzed this tendency in more detail by changing filtering window, latitudes and MLT.

In addition, we show the relationship with AE index to estimate the effort of external factors (e.g. substorms).

Keywords: SWARM satellites, high-latitude ionosphere, field-aligned current, magnetic fluctuations, separation of temporal and spacial fluctuations

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Spatial characteristic of mid- and low-latitude Pi2 pulsations observed by the Swarm satellite in the upper ionosphere

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At substorm onsets, low-latitude Pi2 pulsations are observed on ground. While low-latitude Pi2 pulsations on the night side have high coherence with magnetic field perturbations in the compressional and radial components observed by satellites in the plasmasphere, some studies show that there is no magnetic signals in the plasmasphere on the dayside which correspond to low latitude Pi2 pulsations (Takahashi et al., 2005; Teramoto et al., 2008; 2011). Using magnetic field data obtained by the low-altitude Oersted satellite, Han et al. (2004) found that compressional Pi2 pulsations observed on the dayside in the topside ionosphere show out-of-phase oscillation with those at low-latitude ground stations. They suggested that the dayside Pi2 pulsations are generated by the dayside ionospheric current system rather than the cavity mode resonance mode. In contrast, Sutcliffe and Luher (2010) found that no Pi2-related magnetic signals can be detected in the topside ionosphere, using the CHAMP satellite. To reveal generation mechanism of Pi2 pulsations at low latitude, more studies at topside ionosphere are needed.

In this study, we compare Pi2 pulsations observed in the upper ionosphere and on low-latitude ground, using the magnetic field data obtained by the Swarm satellite and at Kakioka (KAK, 27.19 degrees geomagnetic latitude, 208.79 degrees geomagnetic longitude) and San Juan (SJG, 28.20 degrees geomagnetic latitude, 6.10 degrees geomagnetic longitude). The Swarm satellite was launched on November 2013 and consists of the three identical satellites (Swarm-A, -B, and -C) in polar orbits. We statistically investigate Pi2 pulsations observed by the Swarm satellites. On the nightside, Pi2 pulsations in the compressional and radial components have high coherence with those at the low-latitude ground stations. On the other hand, Pi2 pulsations observed by Swarm on the dayside do not show high coherence with those on the low-latitude ground stations. We will show typical Pi2 events observed by the Swarm satellites at different local times and discuss possible mechanisms of low-latitude Pi2 pulsations.

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The study of ULF pulsation driven by the KH instability using a next generation M-I coupling simulation model

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ULF pulsation plays an important role in electron acceleration of outer radiation belt. One of the ULF generation mechanisms is an excitation due to KH instability at the magnetopause. Claudepierre et al. [2008] reported the ULF pulsation following the KH instability using a global MHD simulation model. Our next generation magnetosphere-ionosphere coupling global MHD simulation model reproduced the ULF pulsation at the magnetosphere and the ground following the KH instability because the resolution is improved. In this study, we have done the spectral analysis to ULF pulsation at the magnetosphere and ground. We drove the simulation changing the solar wind velocity of 800 km/s, 600 km/s, and 400 km/s. we made the spatial distribution of the integrated ULF wave power at the equatorial plane. In the results, we found that the integrated ULF wave power and the peak frequency depend on the solar wind velocity. The integrated ULF wave power is distributed lying on 2-3 layers at the magnetopause. These features are consistent with the results of Claudepierre et al. [2008]. We also found that there is the region of the strong ULF power, which seems to propagate form KH instability, at L= 8 Re in the night side in the case of northward IMF and the solar wind velocity of 800 km/s. In this lecture we will report the results of the detail analysis.

Keywords: ULF pulsation, KH instability, global MHD simulation