[EE] Evening Poster | P (Space and Planetary Sciences) | P-EM Solar-Terrestrial Sciences, Space Electromagnetism & Space Environment

[P-EM15]Dynamics in magnetosphere and ionosphere

convener:Yoshimasa Tanaka(National Institute of Polar Research), Tomoaki Hori(Institute for Space-Earth Environmental Research, Nagoya University), Aoi Nakamizo(情報通信研究機構　電磁波研究所, 共同), Mitsunori Ozaki(Faculty of Electrical and Computer Engineering, Institute of Science and Engineering, Kanazawa University)

Mon. May 21, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

This session provides an opportunity to present recent results from satellite and ground-based observations and theoretical and simulation studies on the magnetosphere, ionosphere, and their coupling system. We invite contributions dealing with various phenomena related to the magnetosphere-ionosphere system: solar wind-magnetosphere interaction, magnetosphere-ionosphere convection, field-aligned current, magnetic storms/substorms, neutral-plasma interaction, ionospheric ion inflow and outflow, aurora phenomena, and so forth. Discussions on planetary and satellite ionosphere and magnetospheres, future missions and instrument developments are also welcome.

[PEM15-P13]Estimation of precipitating electron energy from intensity ratio of auroral red and green emissions obtained with an auroral spectrograph at Longyearbyen, Svalbard

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We report a method to estimate the energy of precipitating electrons using the ratio of auroral green line and red line taken by an auroral spectrograph (ASG) at Longyearbyen, Svalbard (geographic latitude : 75.2 deg, geographic longitude : 16.04 deg and MLAT : 82.2 deg).
Energy range of precipitating auroral electrons distributes from 10 eV to 30 keV, and electrons with higher energy penetrate into the deeper atmosphere [*Rees* 1989]. *Rees and Luckey* [1974] clarified a relationship between a column intensity ratio of auroral 630.0 nm and 557.7 nm emission and characteristic energy of precipitating electrons. It is important to estimate the energy of precipitating electrons since precipitating electrons are characterized by magnetospheric source region and field-aligned acceleration region. Although precipitating electrons have been mainly observed with satellites or sounding rockets, there are a few studies based on ground-based remote-sensing measurements for long-term period.
In this study, we developed a method to estimate characteristic energy of precipitating electrons from the intensity ratio of auroral 630.0 nm and 557.7 nm emissions using the data obtained by ASG at Longyearbyen, Svalbard.
The ASG consists of a fish-eye lens, slit, grism and a cooled CCD detector which covers the wavelength range of 420-730 nm with a 2.0 nm spectral resolution. The field of view and spatial resolution along a meridian is 180°and ~0.36°, respectively [*Taguchi et al.*, 2002]. Because ASG has been operated countinously since December, 2000. The sensitivity calibration was made in March, 2010 at the laboratory in NIPR. Since then, changes in transmittance of a plastic dome and/or a whole system of the ASG including efficiency of CCD detector may not be ignored. Thus, we corrected such changes with standard star data taken by ASG. The standard star is Capera. Comparing intensity ratio of 630.0 nm and 557.7 nm of standard star, we derived the correction coefficient to estimate the intensity ratio of

auroral 630.0 nm and 557.7 nm. Then, characteristic energy of precipitating electrons are obtained with the model given by *Rees and Luckey* [1974].
Applying this method to an active auroral event on January 24, 2012, we estimated that electrons with 0.08keV-1.2keV during the period of 15:00-16:00 UT. The result suggests that relatively high energy electrons of 1.2 keV precipitate at the center of aurora arc, while relatively low energy electrons of 0.08 keV precipitate around the side of aurora arc. The method is useful to examine a long-term variation of energy of precipitating electrons using the long-term ASG data for 16 years. For further quantitative estimation, such as energy flux, other auroral emissions such as 427.8 nm are required.
We are going to derive the more detailed correction coefficient to estimate the intensity ratio of auroral 630.0 nm and 557.7 nm with standard stars, such as Arcturus and Vega. Moreover, we are going to do an analysis with auroral 427.8nm emission, as well as 630.0nm and 557.7 nm.