

## The relationship between the corotating aurora and the plasmasphere

# Saori Toyoshima[1], Hiroshi Fukunishi[2], Minoru Kubota[3], Yasuhiro Murayama[3]

[1] Science, Tohoku Univ., [2] Department of Geophysics, Tohoku Univ., [3] CRL

<http://pat.geophys.tohoku.ac.jp>

As part of the CRL-UAF cooperative middle atmosphere project, monochromatic imaging observations of aurora and airglow have been carried out at Poker since October 2000. Monochromatic images are obtained every 5 minutes using two all-sky imagers at 10 emission lines. From these data, a new type of aurora which is stationary on the sky with some patch structures was found in the magnetic evening sector by Kubota et al. [2002]. We have investigated such 'corotating aurora' in detail using 29 events identified in the period from October 2000 to April 2002. The corotating aurora is observed only in the dusk to midnight sector (14 - 03 MLT), mainly in the evening sector. When the corotating aurora is observed, there are no substorm and magnetic storm activities and  $K_p$  values are smaller than 3+. Occurrences of this type of aurora are identified at the emission lines of OI 557.7 nm, N<sub>2</sub><sup>+</sup> 427.8 and OI 844.6 nm, but not at OI 630.0 nm and H $\beta$  486.1 nm. This spectral feature suggests that the corotating aurora is excited by precipitating hard electrons. From the DMSP/SSJ data, it is identified that precipitating electrons with energies of a few keV are the source of this aurora, and that precipitating ions make no contribution to this aurora. The DMSP/IDM data suggest that the corotating aurora region is usually mapped to the transition region between the corotating plasmasphere and the magnetospheric ring current region. Using simultaneous IMAGE/EUV data, we have examined the relationship between the corotating aurora and the structure of the plasmasphere for three events. It is found that the corotating aurora region is mapped to the medium plasma density region of  $\sim 10^{22}$  /cm<sup>3</sup>. Further, it is found that the corotating aurora region corresponds to the region where plasma flows out from the plasmasphere. Further data analysis using more spacecraft and ground-based data will be performed to elucidate the generation mechanism of the corotating aurora. The corotating aurora would become a tool for monitoring the penetration of magnetospheric electric field into the transition region between the corotating plasmasphere and the magnetospheric ring current region.