

Comparison of precipitating particle energy of proton aurora at geomagnetic conjugate points

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It is expected that mirror images of aurora are observed at geomagnetic conjugate points in the northern and southern auroral zones connected by a geomagnetic field line. However, geomagnetic conjugate auroras often show non-conjugacy, which reflects north-south asymmetry of the solar wind, the magnetosphere and the ionospheres. In other words acceleration mechanism of auroral particles may be studied by comparing aurora simultaneously occurring at geomagnetic conjugate points. A hydrogen Balmer beta emission at the wavelength of 486.1 nm which is the brightest among the proton auroral lines was observed at a pair of geomagnetic conjugate points to compare precipitating particle energy. Two identical Proton Auroral Spectrographs (PASs) which obtain auroral spectra along a geomagnetic meridian at a rate of 1 image/min were installed at Tjornes in Iceland and Syowa Station in Antarctica. Data obtained during a period from September 4, 2018 to October 9, 2018 were analyzed to derive an average kinetic energy of precipitating protons along a local geomagnetic field line from a Doppler shift of the H beta line. As a result we are succeeded in simultaneous observations of proton auroras at both conjugate points in 5 nights on September 4, 5, 6, 7, and 10. The average energies of precipitating protons range from 0 keV to 7 keV, and sometimes show a periodical variation with a period of 4 - 5 min. Conjugacy of precipitating particle energy will be discussed in the presentation.