Unusual ionospheric absorption events observed by the imaging riometer in the Brazilian magnetic anomaly

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Using the imaging riometer(38.2 MHz) installed newly at Santa Maria(L=1.2) in the southern area of Brazil, observations of ionospheric absorption started from 1999. The aim of the observations is to detect precipitaion of energetic electrons from the inner radiation belt. We present unusual two ionospheric absorption events associated with SC geomagnetic storms. It is characterized that the absorption shows azimuthal drift motion, from which the energy of precipitating electrons is estimated to be about 20 keV.

The Brazilian magnetic anomaly is characterized as a global minimum in the earth's magnetic field intensity. This proides a permanent sink for quasi-trapped particles in the inner radiation belt. An imaging riometer(IRIS, 38.2 MHz) was newly installed at Santa Maria (L=1.2) in the southern area of Brazil in order to observe ionospheric absorption caused by energetic electron precipitation. The IRIS observation has been carried out continuously since 1999.

We present unusual two ionospheric absorption events during the SC geomagnetic storms in September 1999. The events are characterized as azimutal drift motions (about 200 m/s) at the high-latitude part in the IRIS field of view (FOV). From the drift motion due to the magnetic gradient and ExB force in the plasmasphere, electron energy of precipitation is estimated to be about 20 keV. This energy could cause ionization enhancement at the E-region ionosphere, which is confirmed by increasing f0Es data by the ionosonde at Cachoeira Paulista in Brazil.

Another characteristic point is that the absorption region move to the lower-latitude with localized enhancement(100-150 km) at the high-latitude part in the IRIS-FOV. This may indicate that energetic electrons in the inner radiatin belt diffuse earthward associated with the strong SC magnetic storm. NOAA satellite particle data showed pronounced precipitation of >30 keV electrons associated with the strong geomagnetic storm. A comparison between the ground-based riometer data and satellite particle data is an interesting further work.