Ionospheric absorption events in the Brazilian magnetic anomaly associated with magnetic storms

Masanori Nishino[1], Kazuo Makita[2], Kiyohumi Yumoto[3], Akira Morioka[4]

[1] STE Lab. Nagoya Univ, [2] Engineering, Takushoku Univ., [3] Earth and Planetary Sci., Kyushu Univ., [4] Planet. Plasma and Atmos. Res. Cent.,Tohoku Univ.

The Brazilian magnetic anomaly is characterized as a global minimum in the earth's magnetic field intensity. This provides a permanent sink for quasi-trapped particles in the inner radiation belt, because particles precipitate deeply into the ionospheric E-region over Brazil.

The imaging riometer(IRIS, 38.2 MHz) installed at Santa Maria(L=1.2) in the southern area in Brazil is a powerful tool to detect electron precipitation and to measure movement and shape of the ionospheic absorption region. The IRIS obsevation has been carried out continuously in collaboration with Brazilian INPE.

As an initial result, we presented unusual ionospheric absorption event associated with the SC magnetic storm occurring on September 22, 1999. The event was characterized as eastward drift at the higher-latitude part in the IRIS field-of-view (FOV). Combining with the electric field data observed by low-altitude satellite, electron energy of precipitation was estimated to be about 20 keV. This precipitaion could cause an ionization enhancement at the E-region ionosphere, which was compared by increasing foEs data by the ionosonde at Cachoeira Paulista in Brazil. Another characteristic was the motion of localized enhancement at the low-latitude part of the IRIS FOV. This indicates that quasi-trapped electrons in the inner radiation belt may diffuse earthward associated with the strong SC magnetic storm.

In this presentation, we show other characteristic ionospheric absorption events observed by the IRIS associated with strong magnetic stroms occurring in 2000, particularly on the strong magnetic storm on July 15, 2000, simultaneous NOAA satellite observed an enhancement of electron fluxes of 30-1100 keV in the low-latitude region of L=1.5 around the maximum depression (Dst, -300 nT). Ionospheric absorption showed an east-west extension in the higher-latitude FOV. Simultaneous low-latitude ground magnetic H-component data showed swing variations around the maximum depression.

We also present other ionospheric absrption events associated with the magnetic storms on August 11 and September 17. From these events we describe characteristics of the ionospheric absortion events proper to the Brazilian magnetic anomaly.