

DP2 type ionospheric electric field fluctuations observed by FM-CW HF radar

Manabu Shinohara[1]; Akihiro Ikeda[2]; Kenro Nozaki[3]; Akimasa Yoshikawa[4]; Vasily V. Bychkov[5]; Boris M. Shevtsov[5]; Teiji Uozumi[6]; Shuji Abe[1]; Terumasa Tokunaga[7]; Jose K. Ishitsuka[8]; Kiyohumi Yumoto[1]; Yumoto Kiyohumi MAG-DAS/CPMN Group[9]

[1] Space Environ. Res. Center, Kyushu Univ.; [2] Earth and Planetary Sci., Kyushu Univ.; [3] NICT; [4] Earth and Planetary Sci., Kyushu Univ.; [5] IKIR, FEB, RAS; [6] SERC; [7] none; [8] Observatorio de Ancon, Instituto Geofisico del Peru; [9] -

The FM-CW (Frequency Modulated Continuous Wave) type HF radar was installed at the low-latitude station Sasaguri (SAS, geomagnetic latitude = 26 degrees), Japan and the mid-latitude station Paratunka (PTK, geomagnetic latitude = 46 degrees), Kamchatka, Russia to observe zonal electric field fluctuations in the ionosphere.

DP 2 type geomagnetic fluctuations appear coherently at high latitudes and at the dayside dip equator. The equivalent current system of DP 2 fluctuations consist of two vortices in the polar region. And the dawn to dusk electric field penetrates from the polar region to the low latitudes and the equatorial region. By using the FM-CW HF rader, electric field fluctuations of DP 2 in the ionosphere were observed at middle and low latitudes. In this paper, we mainly discuss in the nightside events.

Observed electric field fluctuations were coherent to magnetic fluctuations observed at the dayside dip equator station Ancon (ANC), Peru. The SAS radar observed DP 2 fluctuations on May 6, 2003 in the nightside. The amplitude ratio of electric field fluctuations observed by the radar to magnetic field fluctuations observed by the magnetometer at the dayside equator is 0.018 mV/m/nT. On the other hand, the PTK radar observed DP 2 fluctuations on April 1, 2007. The amplitude ratio of electric field fluctuations observed by the radar to magnetic fluctuations at the dayside equator was 0.072 mV/m/nT.

The amplitude of DP 2 electric field fluctuations decreases with decreasing latitude in the nightside ionosphere. In the observed events, amplitude ratio of electric field fluctuations at 26 degrees geomagnetic latitude to those at 46 degrees is about 1/4.