

# Characteristics of plasma bubble occurrence using IGS-GPS receivers data

# Michi Nishioka[1]; Akinori Saito[2]; Takuya Tsugawa[3]

[1] SPEL, Kyoto-University; [2] Dept. of Geophysics, Kyoto Univ.; [3] STE Lab., Nagoya Univ.

Occurrence rate of plasma bubble was studied with GPS Total Electron Content (TEC) data. Seasonal-longitudinal dependence and solar activity dependence were investigated using GPS receivers in the equatorial region.

We identified plasma bubbles using rate of TEC index (ROTI) data derived from GPS data of International GPS Service. We used the data from the stations located within 15 degrees from the dip equator. The data period was from 2000 to 2004.

The stations were classified into five regions according to their magnetic declination angles, that is, Asian, African, South American, Western Pacific and Central Pacific regions in order to investigate the dependency of the longitudinal variation of plasma bubble occurrence on the magnetic declination.

In Asian region, the maxima of plasma bubble occurrence appeared at equinoxes when geomagnetic field line and sunset terminator were almost parallel.

In African region, the spring maximum appeared later than vernal equinox and the autumn maximum appeared earlier than autumnal equinox.

In South American and Western Pacific region, the spring maximum came earlier than vernal equinox and the autumn maximum delayed from autumnal equinox.

We found that the plasma bubble occurrence in 2003 and 2004 was 20% lower than that of 2000 and 2001. This percentage corresponds to 70 days in one year. In Asian and African region, the highest occurrence was marked in early 2002, and in South American and Western Pacific region in late 2002.

We discuss the seasonal-longitudinal variation and the solar activity dependence of plasma bubble.