

PEM032-13

Room:103

Time:May 26 17:30-17:45

Structure of the intense Es observed on June 9, 2008

Ichiro Tomizawa^{1*}, Kei Imai¹, Shinji SAITOH²

¹Center for Space Sci. & Radio Eng., UEC, ²Electronic Navigation Research Institute

In the recent study we have revealed that the intense Es event ($f_oE_s > 30\text{MHz}$) observed on June 9, 2008 had the occurrence area of about 150km in the east-west direction and moved about 200km in north, by using the amplitude scintillation observations of the stationary satellite MTSAT-2 and the GPS satellites in corresponding to the wavefront structure deduced by the HF doppler observations. the analysis was performed by using the 24 amplitude scintillation events because they can be easily identified by the quasi-periodic shape, the duration of less-than 1 minute and the peak-to-peak amplitude of more than 6dB, even in fluctuating data, and because the TEC variation only shows a small noise-like fluctuation. In this study we have found out the relationship between the shape and timing of the TEC variation and the amplitude scintillation in the Es events. Thus we applied the method to identify TEC variations as a Es event, and obtained totally 20 events in the TEC data. Those events show the TEC increase of less than 0.7TECU and the same duration as the amplitude scintillation.

The quasi-periodic amplitude variation can be modeled by a diffraction pattern produced by a long and cylindrical Es with a Gaussian-shape in cross section [2]. We have obtained the full-width of 120m and the peak electron density of $3 \times 10^{13} \text{m}^{-3}$ by using the observation parameters, $f=1575.42\text{MHz}$, $v=55\text{m/s}$ and $h=120\text{km}$. the peak electron density may explain the intense f_oE_s value of more than 30MHz observed at the NICT Kokubunji. Then the equivalent width can be calculated as 230m dividing the TEC enhancement of $7 \times 10^{15} \text{m}^{-2}$ by the estimated peak electron density. We can, therefore, suppose a diffusive electron distribution around the main Gaussian distribution. It is concluded that the cross-section structure of the intense Es on June 9, 2008, is implimented by the peak electron density of $3 \times 10^{13} \text{m}^{-3}$, the main width of 120m, and the diffusive attachment.

Acknowledgements: The GPS data is supplied bby the Electronic Navigation Research Institute (ENRI), and the ionogram data is supplied by the National Institute of Information and Communication Technology (NICT).

References:

- [1]I. Tomizawa, K. Imai, S. Gotoh, S. Saitoh, and Y. Shibuta: SGEPS 2010 in Okinawa, p.B005-31, 2010.
- [2]J.E. Titheridge: J. Atmos. Terr. Phys., vol.33, pp.47-69, 1971.

Keywords: sporadic E (Es), structure of Es, amplitude scintillation, TEC