

PEM032-P18

Room:Convention Hall

Time:May 27 10:30-13:00

## Amplitude of ionospheric disturbance heights estimated by scintillations of geostationary satellite signals

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Amplitude scintillations of ionospheric disturbances have been observed at Sugadaira Space Radio Observatory, UEC by using the 1.5GHz band signal of ETS-VIII(146°E) and MTSAT-2(145°E). The amplitude scintillation were observed at three separate points to obtain the horizontal velocity of the scintillation pattern on the ground by time lag of waveforms. We independently estimate the heights of of ionospheric irregularities in the following two methods to check the consistency of these estimated heights.

(1)Two satellite method: The irregular heights ( $h$ ) deduced from time lag ( $dt$ ) and velocity of irregular structure  $v$ . Time lags between two signals by assuming the irregularities moving across the propagation paths. The height  $h$  can be calculated by the following equation:  $d = v * dt$ ,  $z = (d / \sin a)$ ,  $h = z * \sin(EI)$ .

(2)Spectral analysis method: As the scintillation spectrum shows the Fresnel filtering characteristics, we can deduce frequency  $f_n$  at the  $n$ -th minimum value in vibrating part, Fresnel frequency and  $f_F$  by the distance  $z$  from the observation point to irregular structure, and the velocity  $v$ . So the distance  $z$  can be estimated as  $v \cdot f \cdot F\{F\} = v / \sqrt{\pi * \lambda * z}$ ,  $f_f = f_n / \sqrt{n * \pi}$ .

The amplitude scintillation event occurred from 0:00 to 3:00 JST on May 30, 2010 is analyzed by using the horizontal velocity 50 ~ 250 m/s and direction of 310° on the ground obtained by three points observation. The estimated heights from 2:00 to 3:00 of the two methods showed the similar height variation during this period. Therefore, it is concluded that the two height estimation methods can give the actual height distribution of ionospheric irregularities.

### Acknowledgment :

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### Reference

[1]C.H.Liu and K.C.Yeh:Model computations of power spectra for ionospheric scintillations at GHz frequencies, J.atmos.terr.Phys, Vol.39,pp.149-156,1976.

Keywords: Ionosphere