

Optical and Radio Measurements of Equatorial Plasma Bubbles Over Indonesia

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We have operated an all-sky airglow imager and three single-frequency GPS receivers at the Equatorial Atmosphere Radar (EAT) site (0.20°S, 100.32°E; geomagnetic latitude 10.6°S) in West Sumatra, Indonesia since October 2002 and January 2003, respectively. Using these instruments, we have obtained following observational results about equatorial plasma bubbles.

(1) We have conducted coordinated observations of the EAR and the all-sky airglow imager on the night of April 1,2003. Spatial distributions of backscatter were obtained by performing east-west scans with the 45-MHz EAR. A 630-nm airglow depletion, caused by a plasma bubble, was simultaneously observed with an all-sky airflow imager. Comparing the FAI structures with the airflow depletions, we found that FAI occurred within the entire airglow-depleted region. Details of this result are reported by *Otsuka et al.* [2004].

(2) A radio signal passing through small-scale irregularities in the ionospheric electron density fluctuates in amplitude and phase since the irregularities act as diffraction gratings. This phenomenon is known as the "scintillation". The GPS receivers sampled GPS signal intensity at 20Hz. An analysis of the scintillation index (S4) obtained in two years (2003-2004) revealed that the scintillation often occurred at 2000-0100 LT in March-April and September-October. The scintillation was not observed after 0100 LT, probably due to decay of small-scale irregularities causing scintillation.

Keywords: Equatorial ionosphere; Airglow; Radar; GPS; Scintillation

References

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