Scintillation Drift Velocity Observed by Closely-Spaced GPS Receivers in Indonesia

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To investigate zonal drift velocities of a few hundred meter-scale irregularities associated with equatorial plasma bubbles, we have operated three single-frequency GPS receivers at the Equatorial Atmosphere Radar (EAR) site at Kototabang, West Sumatra, Indonesia (0.20°S, 100.32°E; geomagnetic latitude 10.6° S) since January 2003.The GPS receivers sampled GPS signal intensity at a rate of 20 Hz. Distances between the receivers were 116, 127, and 152 m. Drift velocities of irregularities were measured using cross-correlation analysis with the time series of the GPS signal intensity obtained from the three receivers. By analyzing the drift velocity data, equinoctial asymmetry of the zonal drift velocity is found. The eastward drift velocity is higher in March Equinox than in September equinox (Otsuka et al. 2006, Abadi et al., 2017). By analyzing the drift velocity data obtained during a period from 2003 to 2021, in this study, we investigate seasonal and solar activity and magnetic activity dependence of the drift velocity.

Keywords: equatorial ionosphere, GPS, plasma bubble

