Characteristics of 3-meter Field-Aligned Irregularities in Ionospheric Sporadic E Region Observed by Using Chung-Li 52 MHz Radar

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In the past decade one of the major progresses of the Chung-Li 52 MHz radar is the successful implementation of the interferometry capability in the observation of the plasma irregularities in ionosphere sporadic E region. In this report, about 13,000 Doppler spectra of the Es plasma irregularities were statistically analyzed, which were collected from the radar experiments conducted in the nighttime on various days. The parameters that were employed for the statistical analysis include echo power, Doppler velocity, spectral width, skewness, elevation and azimuth angle of echoing region, true height, zonal and meridional extents of the plasma irregularity structures. The statistics of the spectral moments show that echo powers are in the range from70 to 90 dB, Doppler velocities distribute in -100 ~ 200 m/s with mean value of about -25 m/s (indicating away from the radar), spectral width is in range 2.5 ~140 m/s, and skewness is in range -1~1 with zero mean. Statistics also show that the height range that the Es irregularities appeared is from 95 to 125 km, and the zonal extent of the plasma structures with mean aspect angle of about 0.25° is in average about 10 km. The implication of these statistic results is discussed in this representation.