# Characteristics of F-region irregularities near a northern anomaly crest during the rising half of solar cycle 23

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In this work, we study the F-region irregularities near the northern crest of equatorial ionization anomaly (EIA) in the west Pacific sector. During 1996-2000, the F-region irregularities are observed by the Chungli ionosonde (24.9˚N, 121.2˚E), YMSM GPS receiver (25˚N, 121.6˚E), and DMSP satellites. It is noted that the 23rd solar cycle began in 1996 and had a maximum in 2000. The data of F-region irregularities are spread F of ionosonde, GPS phase fluctuations of GPS, and plasma bubbles of DMSP satellites. The seasonal and nighttime variations in occurrence probabilities for spread-F, GPS phase fluctuations, and plasma bubbles are calculated. In general, the seasonal variations in occurrence probabilities are different each year. In any year, the seasonal variations of three instruments are different from one another. In the nighttime variations in occurrence probabilities, the variations of spread-F are not the same as that of GPS phase fluctuations. And, the effects of solar activity on the nighttime variations are different each season. These results indicate that the characteristics and mechanisms of F-region irregularities would vary with seasons and/or solar activities.

Keywords: F-region irregularities, spread F, GPS phase fluctuations , plasma bubbles

 