

The spread F and GPS phase fluctuations at Taiwan, China

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The spread F and GPS phase fluctuations concurrently observed at Taiwan from 1996 (solar minimum) to 2000 (solar maximum). It is the first attempt to study long-term variation of the spread F and GPS phase fluctuations in north equatorial ionization anomaly (EIA) area. The spread F obtained by an ionosonde (24.95°N, 121.23°E) are classified into two categories (range spread F and frequency spread F), and GPS phase fluctuations which derived from three GPS receivers ($\sim 25^\circ\text{N}$, $\sim 121^\circ\text{E}$) are divided into three levels (background, moderate, and strong) to represent the strength of irregularities. The seasonal and nighttime variations in each year have been exam in detail. The results show that the occurrence of spread F is higher than that of GPS phase fluctuations. Moreover, the spread F and GPS phase fluctuations show anti-correlation in occurrence proportion.