



The Case Study of the Unseasonal Ionospheric Irregularities in China Low Latitude Region

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The ionospheric irregularities can bring about rapid random and strong fluctuation in radio wave amplitude or phase propagating in it, resulting in reduction of the signal to noise ratio, even loss of the signal for receivers. Long-term studies shows that the ionospheric irregularities mainly occur in low latitude or polar region and exhibit obvious spatial and temporal distribution. It mainly occurs after sunset and lasts to near midnight, it mainly occurs in equinox months in East Asian and Pacific sector. R-T instability related to some parameters in ionospheric region determines its occurrence and evolution. However, during winter and summer months, the ionospheric irregularities also can occur occasionally even under quiet geomagnetic condition that are named as unseasonal ionospheric irregularities. The studies about the morphological distribution of these kinds of irregularities can reveal its evolution mechanism and are of interest to ionospheric researcher. In Summer month of 2013, two severe ionospheric irregularities events occurred in low latitude of East Asia. Combining the ionograms obtained at Sanya, Haikou, Guangzhou ionosonde stations of China and the rate of ionospheric TEC index (ROTI) calculated from the measurement of the dense distributed GNSS stations in China low latitude, the spatial and temporal variations of these two ionosphere irregularities events are studied in detail. It is found that the irregularities developed at about 10 LT and last to about 1-2 LT, the irregularities expanded gradually from low latitude to higher latitude, which reached about 30° N. In the meantime, the irregularities exhibit an eastward drifting tendency. These features are revealed both in ionograms and ROTI maps accordantly.