

Observation of GNSS scintillation in Tromso

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Ionospheric scintillation is a phenomenon that received radio wave fluctuates in phase and amplitude. It has been known that amplitude scintillation frequently occurs at equatorial regions, and that phase scintillation frequently occurs at high latitudes. We have been operating dual-frequency GNSS (Global Navigation Satellite System) receivers at Tromsø, Norway. The receivers are controlled by PC and record carrier phase and signal-to-noise ratio of the received signal from GPS satellites. We have calculated S4 and $\sigma\phi$ indices. S4 is defined as a ratio of standard deviation of the signal intensity to the average signal intensity in each 1 minute. $\sigma\phi$ is defined as the standard deviation of the phase of the received signal. During November and December 2013, in 12 days, we observed amplitude scintillation events in which S4 exceeds 0.3. In 7 days out of 12 days, magnetic activity was high. In this study, we will compare the amplitude scintillation with phase scintillation and total electron content (TEC) obtained from the GNSS receivers to discuss generation mechanisms of ionospheric irregularities causing the amplitude scintillations.

Keywords: scintillation, ionosphere, GPS, GNSS, geomagnetic disturbance, TEC