

Ionospheric Scintillation Observations with GNSS receivers in Tromsø, Norway

*Yuichi Otsuka¹, Kodai Uwashitomi¹, Yasunobu Ogawa², Keisuke Hosokawa³

1.Institute for Space-Earth Environmental Research, Nagoya University, 2.National Institute of Polar Research, 3.University of Electro-Communications

Ionospheric scintillation is a phenomenon that received radio wave fluctuates in phase and amplitude. We have been operating dual-frequency GNSS (Global Navigation Satellite System) receivers at Tromsø, Norway to measure signal intensity and phase of the radio waves at a sampling rate of 50 Hz.

We have analyzed ROTI, defined as a standard deviation of the differential of TEC (Total Electron Content) during 1 minutes. At 00:10-00:20 UT on 8 February 2014, ROTI increased to 0.7 TECU/min, but S4 did not increase. We have calculated cross-correlation coefficient (CCC) of TEC variation obtained at two-antennas installed with a mutual distance of 242 m, and found that CCC is close to unity. This result indicates that the plasma density in the ionosphere is spatially homogeneous although it varies temporally. On the other hand, at 11:30-12:00 UT on 27 October 2014, S4 index increased to 0.4 whereas ROTI was low. For this event CCF of TEC variations at the two-antenna is approximately 0.6, indicating the ionospheric plasma density was inhomogeneous to cause amplitude scintillation.

Keywords: ionosphere, GNSS, scintillation