

The local Total Electron Content (TEC) fluctuations climatology

Kacper Kotulak, Irina Zakharenkova, IuriiCherniak, Andrzej Krankowski, Adam Froń

Space Radio-Diagnostics Research Centre

University of Warmia and Mazury in Olsztyn

POLAND

ABSTRACT

For decades, GNSS techniques have been one of the main tools in ionospheric monitoring. Since 2018, the vast range of the International GNSS Service's (IGS) ionospheric products has been complemented with a new one, dedicated to the ionospheric fluctuations — the northern hemisphere Rate of TEC Index (ROTI) maps. For many scientific and technological users, information about severity of Ionospheric Total Electron Content (TEC) fluctuations is even more crucial than absolute TEC values.

We hereby present a long-term statistical analysis of the GNSS ROTI index. Our study includes ROTI observations from stations distributed along the chosen meridians of $\sim 16^\circ\text{E}$ in Europe and $\sim 100^\circ\text{W}$ in Northern America for three years of different solar activity: 2013, 2015, and 2017. Such approach would allow study of latitudinal, zonal, diurnal, seasonal, annual, and solar-cycle variation as well as morphology of ionospheric irregularities.

We also include solar and geomagnetic activity indices into analysis to examine response of ionospheric plasma irregularities pattern to space weather events of various intensity.