

Variation of the Ionospheric Scintillation Index with Elevation Angle of the Transmitter

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A b s t r a c t

We have analyzed GPS data from 2007-2011 to determine the nature of variation of scintillation index with elevation of the direction of propagation at an observing point Warsaw, Poland, and Hornsund, Svalbard. To compare with the theory, the intensity scintillation index is simulated as a function of elevation angle, azimuth, magnetic field inclination, and shape of irregularities, using the phase screen model of scintillation as formulated by Rino (1979). Data analysis has been done for the seasonal as well as geomagnetic activity dependence of ionospheric scintillation. Scintillation index is a power-law function of the cosecant of the elevation angle. Results show that the power law strongly depends on the form of irregularities, being larger than in isotropic case for irregularities with dimension along the magnetic field direction smaller than those across the magnetic field. The present work also shows the need to use experimentally derived dependence on elevation.

Key words: GPS, scintillation index, elevation angle, azimuth.