



Effects of magnetic storms on GPS signals at high latitudes in the European sector

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Transionospheric radio signals may experience fluctuations in their amplitude and phase due to irregularity in the spatial electron density distribution, referred to as scintillation. Ionospheric scintillation is responsible for transionospheric signal degradation that can affect the performance of satellite based navigation systems.

The effects of different magnetic storms on GPS signals based on 50 Hz GPS measurements recorded at Dirigibile Italia Station (Ny-Alesund, Svalbard) are considered. These effects are described by using typical scintillation indices able to assess the scintillation activity on both the received signals intensity and phase. Moreover, signal dynamics and fading levels are also used for characterising ionospheric effects on GPS signals. The impact of electron density irregularities on GPS signals is discussed with regard to both scientific aspects and receiver performance.