



## Diagnose the diffractive contribution to GNSS scintillation at high latitude during the geomagnetic storm on 7-8 September 2017

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The ionospheric plasma irregularities can cause severe scintillation of the trans-ionospheric radio waves, e.g., signals from the global navigation satellite system (GNSS). The phase scintillation of GNSS signal are usually caused by both refractive and diffractive variations, while the amplitude scintillation is mainly attributed to diffractive process. At high latitude, the GNSS signals usually exhibit strong phase scintillation, but the meanwhile amplitude scintillation is very low. Such a feature leads to the commonly known issue as “phase without amplitude scintillation at high latitude”. In this study, we focused on the geomagnetic storm happened on 7-8 September 2017. High-resolution data from four GNSS receivers at high latitudes were utilized. Quite intense phase and amplitude scintillations, represented by  $\sigma_4$  and  $S_4$ , respectively, were observed during the storm mainly phase. By checking the ionosphere-free linear combination (IFLC) parameter, the intense phase and amplitude scintillations are found associated with diffractive effects. Simultaneous observations from the Swarm satellite have been further analyzed to resolve the possible reasons that cause the diffractive influence of scintillation.