



An inspection of scintillation spectra at high latitude

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The random amplitude and phase fluctuations of a trans-ionospheric radio signal are caused by electron density irregularities that take place in the ionosphere. Ground measurements of the radio signal can therefore contribute for the understanding the plasma instability mechanisms that generate these ionospheric irregularities. Global Positioning Satellite (GPS) measurements made by the Canadian High Arctic Ionospheric Network (CHAIN) are used to scrutinize the distortion seen in the trans-ionospheric radio signal. In the polar region, the signal phase fluctuations are not always accompanied by amplitude fluctuations. When fluctuations are seen simultaneously both in amplitude and phase, the corresponding density spectra have a comparable power index slope. However, when amplitude fluctuations are absent, the phase variations spectrum is noticeably steeper. The first scenario seems to point to the presence of a significant small scale fluctuations power. These results strongly suggest that the distortion in the amplitude signal is caused by Fresnel scale irregularities on the contrary to the signal phase variation which seem to emerge from a refractive process.