



Observations of simultaneous multi-constellation GNSS scintillation in nightside aurora over Svalbard

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We present multi-instrument observations of severe GNSS scintillations associated with nightside aurora over Svalbard, using several all-sky imagers and 50 Hz multi-constellation GNSS receivers (GPS, GLONASS, Galileo).

Transionospheric signals such as GNSS are impacted by ionospheric scintillations. Such scintillations can cause signal fading and loss of lock in the receiver, potentially impacting the receiver's position solution. At high latitudes, GNSS scintillations are associated mainly with patches in the polar cap and with auroral precipitation and emissions in the auroral oval.

Both the polar cap and the auroral oval are highly dynamic systems, making it difficult to predict the impact on GNSS signals and their reliability. In this study we show results from case studies in order to better understand the mechanisms by which auroral precipitation impacts GNSS signals. We investigate phase and amplitude scintillations relative to auroral features. Also, in a similar approach to van der Meeren et al. [2014], who investigated irregularities at the front of a tongue of ionization in the nightside polar cap, we use spectrograms of 50Hz GNSS raw phase to get an indication of the spatial scale sizes of phase variations.