# Analysis of Severe Phase Scintillation Events Observed in the Auroral Oval

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High-rate Global Positioning System (GPS) data acquired from 2014-2017 by the Canadian High Arctic Ionospheric Network (CHAIN) network of receivers were recently analyzed to examine trends in scintillation across the Auroral Oval. In that analysis phase scintillation events greater than 1 radian were flagged in an effort to identify periods of severe scintillation which could lead to GPS loss of signal lock. Initial results indicate a significant increase in the number of severe phase scintillation events within the Auroral Oval some of which were readily correlated with features observed in SuperDARN data and with local magnetic irregularities. As part of that work phase screen modeling was performed with the Source-receiver Ionospheric-scintillation Global Model of the upper Atmosphere (SIGMA) which was used to generate scintillation sequences that were incorporated into a GPS phase lock loop (PLL) model in order to better understand the role that the orientation of the background magnetic field aligned irregularities may have in creating the conditions which led to the observed geographic distribution of severe phase scintillation. While a relationship between the magnetic field orientation and the performance of the PLL was observed the simulations were unable to capture the sharp increase in the number of severe scintillation events observed in the Auroral Oval. These results suggest that factors beyond the magnetic field orientation are contributing to the conditions leading to increased scintillation in this region. In our current work we have performed a deeper statistical analysis of data from the CHAIN receivers and auxiliary instruments in an effort to gain insight into the morphology and the temporal distribution of features leading to sever phase scintillation in the Auroral Oval.