

# Geomagnetic Activity and GPS Anomalies at High Latitudes

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Many government, commercial, and public interests rely on accurate Global Positioning System (GPS) coordinates. Errors in GPS coordinates originate from a variety of sources including geophysical phenomena. These error sources, particularly ionospheric scintillation, have been studied in detail at low latitudes. This study explored the relationship between high latitude geomagnetic activity and signal degradation. Eight Alaskan National Geodetic Survey (NGS) Continuously Operating Reference Stations (CORS) of varying latitudes were selected. We focused on two types of GPS anomalies: cycle slips and positioning errors. These data sets were generated from RINEX formatted files using a software collection called GPS Toolkit (GPSTk). Planetary geomagnetic index data and geomagnetic index data from the College International Geophysical Observatory near Fairbanks, AK was obtained for this work. A strong correlation between GPS cycle slips and the daily College A-index data emerged. Neither the daily A-indices, nor the three hourly College K-index, exhibited an obvious direct or lagged correlation with three hourly median GPS position errors. Future work will be directed towards examining the data with finer temporal granularity.