

#126 Received 01/21/2015

Coster, Anthea¹; Evan Thomas²; Larisa Goncharenko¹; Allan Weatherwax³; Gary Bust⁴

1. MIT Haystack Observatory

2. Virginia Tech

3. Siena College

4. Johns Hopkins University Applied Physics Laboratory

Analysis of Antarctic Scintillation Measured at McMurdo and South Pole Station

Abstract:

This paper details recent multi-instrument observations in the Antarctic to study the distribution and frequency of scintillation during both quiet and storm-time conditions during solar cycle 24. Multiple years of scintillation data from GPS receivers at South Pole Station and at McMurdo Station have been incorporated into the on-line Madrigal database. Both amplitude and phase scintillation data have been measured and overlaid onto GPS Total Electron Content (TEC) plots available through Madrigal. A statistical analysis based on this data has been completed, and the correlation of measured scintillation with a variety of geomagnetic indices (Bz, Dst, and Kp) has been examined. During storm-time conditions, multiple tongue of ionization (TOI) events are shown to have a high incidence of scintillation associated with large TEC gradients. Scintillation is also clearly with associated aurora. To illustrate this, scintillation data from several Antarctic receivers have been overlaid on top of GPS TEC maps, and separately, on top of all-sky camera images showing evidence of aurora. Data from multiple geomagnetic storms and auroral events in this solar cycle will be presented and results from numerous other data sources including SuperDARN, COSMIC, and DMSP will be incorporated into this analysis.