

1 **Personal Space Weather Station Observations of the Gannon Geomagnetic Storm**
 Rebecca Potter¹, Nathaniel Frissell¹, Gwyn Griffiths², Kuldeep Pandey³
¹University of Scranton, ²HamSCI Community, ³New Jersey Institute of Technology

2 **Introduction**
 • Geomagnetic storms are disturbances in the magnetosphere caused when elevated levels of solar energy are injected into the near-Earth environment
 • Temporarily alter the composition of the ionosphere
 • Effects include satellite drag, navigation system failures, and disruptions to communications
 • The geomagnetic storm known as the Gannon Storm occurred from 20-23 May 2024
 • All geomagnetic storms
 • Most extreme geomagnetic storms since 2000
 • Was a mobile event to our latitude as well as it caused aurora to appear at significantly higher latitudes
 • Significant effects on HF propagation

3 **Purpose**
 To answer the following questions:
 1. When did the PWSN network begin to detect the storm? When did it stop?
 2. What changes occurred in the data in response to the storm?
 Understanding the Gannon Storm's effects on HF propagation can
 • Inform how the ionosphere responds to extreme geomagnetic storms
 • Inform how infrastructure that relies on HF frequencies may be better equipped against similar extreme space weather events in the future

4 **Data**
 • Doppler shift and signal strength data gathered by the HamSCI PWSN network
 • Doppler shift: frequency change due to relative motion between transmitter and receiver
 • Signal strength: power received by the receiver

5 **Methodology**
 1. Compiled a catalog of all PWSNs that were active during the Gannon Storm
 2. Determined local time and select stations, 0020M in northeast PA
 3. Identified the beginning, end, and distinct phases of the Gannon Storm according to IRI-14 plots
 4. Examined all Doppler shift spectrograms of W2NAF's receive frequencies on the dates of the Gannon Storm
 5. Selected one frequency to begin detailed analysis with—15 MHz
 6. Plotted an average quiet-time Doppler shift spectrogram on 15 MHz to use as a reference
 7. Analyzed changes in the data throughout each Gannon Storm phase

6 **Selected Station: W2NAF**
 Map showing the location of W2NAF in Scranton, PA.

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 A JESUIT UNIVERSITY

rebecca.potter@scranton.edu