Katarzyna
Beser
New Jersey Institute of Technology
Gareth W. Perry, New Jersey Institute of Technology
Poster
A polar cap patch is defined operationally as an enhancement in plasma density within the high-latitude F-region of the ionosphere, having spatial scales of the order of 100 km and featuring a density that exceeds twice that of the surrounding ionosphere. The occurrence of these patches at high latitudes is important for two main reasons. Firstly, they arise from complex interactions among the interplanetary magnetic field, magnetosphere, ionosphere, and thermosphere. Secondly, polar cap patches create plasma density irregularities that affect the propagation of radio waves in the high-latitude ionosphere.

Substantial evidence indicates that polar cap patches pose a hazard related to space weather. For instance, they can cause deviations from direct great-circle paths and increase scattering for radio transmissions operating in the high-frequency (HF) spectrum at high latitudes. Despite the clear need to monitor polar cap patches actively, an automated method for detecting them using HF instruments has not yet been developed.

In this study, we present the progress made towards understanding the patches' signature within HF backscatter signal obtained by the Super Dual Auroral Radar Network (SuperDARN), a radar system that provides real-time observations across northern and southern high- and mid-latitudes.

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