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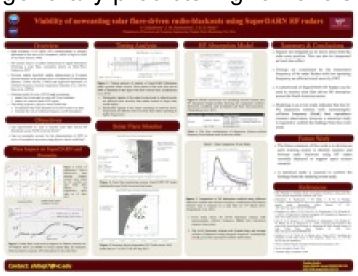
Poster
The first space weather impact of a strong solar flare is radio blackout across the dayside of the Earth. At a delay of just 8 minutes, the arrival of enhanced X-ray and EUV radiation leads to a dramatic increase in ionization density in the lower ionosphere. Operation of high-frequency (HF: 3-30 MHz) systems is often completely suppressed due to D-region absorption, also known as shortwave fadeout or radio blackout. Severe solar flares can disrupt emergency HF communications that support humanitarian aid services, including amateur radio and satellite communication systems. Recent studies have shown that radio blackout is easily detected and characterized using SuperDARN HF radar observations. Statistical studies reported that the onset of blackout is very rapid (~ 1-minute) while recovery takes tens of minutes to hours. Our current predictive capability is based on modeling the ionospheric impacts using solar flux measurements from GOES sensors and an empirical model named D-Region Absorption Prediction (DRAP). We present a technique to characterize radio blackout following solar flares using HF radar. We have developed a monitoring system to identify and monitor radio blackouts using HF radars (over North American Sector) that are currently deployed to support space science research. Networks of such radars operate continuously in the northern and southern hemisphere as part of the SuperDARN collaboration. We have devised a tool that integrates data obtained from the array of North American SuperDARN radars to identify instances of daily radio blackouts and relate them to GOES X-ray irradiance. We also employ a novel empirical model named the X-ray Irradiance-driven D-region Absorption Prediction (X-RAP) model, which generally predicts higher levels of absorption than the DRAP model.

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