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Improved techniques for monitoring and investigating polar cap absorption

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Shock waves produced in front of coronal mass ejections can accelerate solar energetic protons Earthward where they are guided by the Earth's magnetic field into the high-latitude polar cap region. Energetic >10 MeV protons can penetrate into the ionosphere increasing ionization in the D-region causing a polar cap absorption (PCA) event potentially blocking out high frequency (HF) radio communications at high latitudes. This is of direct importance to the safety of transpolar flights which communicate using the affected radio signals. Riometer instruments are able to monitor variations in ionospheric absorption by observing background cosmic radio noise. This presentation introduces the development of a new two-dimensional visualization tool for viewing riometer-derived absorption on a Canada-wide scale. Such a visualization tool will greatly enhance the monitoring and investigation of ionospheric effects on HF radio communication allowing system operators to optimize system performance thereby contributing to the reduction of economic losses during PCA events.

Author: Dr FIORI, Robyn (Natural Resources Canada)

Co-author: Dr DANSKIN, Donald (Natural Resources Canada)

Presenter: Dr FIORI, Robyn (Natural Resources Canada)

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