of Physicists

**Canadian Association** 



Contribution ID: 132

Association canadienne des physiciens et physiciennes

Type: Oral (Non-Student) / Orale (non-étudiant(e))

## The effect of auroral absorption events on HF propagation links over Canada

Tuesday 10 June 2025 14:15 (15 minutes)

Natural Resources Canada (NRCan) operates several over-the-horizon (OTH) High Frequency (HF) radio links across Canada. From 2013-2019, a dedicated link between a transmitter in Ottawa to a receiver in Alert was operated nearly continuously at 6 different HF frequencies from 5 to 14 MHz. For an OTH propagation link to exist between Ottawa and Alert at a given frequency, two criteria must be met: the overall ionospheric electron density between Ottawa and Alert must be sufficient to allow 1, 2, or 3 hop propagation between Ottawa and Alert and the D-region density must be low enough to have minimal absorption along this long propagation path. In this period, the University of Calgary was also operating several 30-MHz GO-Canada riometers across Canada. In this study, we examine the relation between absorption measurements made by the riometers and the likelihood of dropouts in the NRCan HF link. For times when the F-region ionospheric density tends to be sufficient to support propagation links, losses of signal at Alert tend to correspond to higher measurements of absorption at most riometer sites across Canada. Since the riometer measurements from the GO-Canada network are not exactly co-located with the predicted HF link path and D-region pierce points, considerations of the scale sizes of auroral absorption regions need to be made. Also, the dependence of transmission frequency on the absorption measured during dropouts is considered. Overall, the results of this study will provide a deeper understanding of the connection between absorption at 30 MHz and the corresponding effects on lower frequency HF links in the same region.

## Keyword-1

Ionosphere

## Keyword-2

Radio

## Keyword-3

Absorption

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**Session Classification:** (DASP) T2-2 Space Weather, Space Instrumentation, and Operations | Météo spatiale, instrumentation spatiale et opérations (DPAE)

**Track Classification:** Technical Sessions / Sessions techniques: Atmospheric and Space Physics / Physique atmosphérique et spatiale (DASP/DPAE)