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## The Fast Borealis Ionosphere: New observations and insights from mapping the polar ionosphere every four seconds

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For the past three decades, ionospheric drift velocity measurements from the Super Dual Auroral Radar Network (SuperDARN) have been combined at a nominal time resolution of two minutes to produce horizontal patterns of the high-latitude convective flow. Recently, SuperDARN radars operated by the University of Saskatchewan (codenamed Borealis), which overlook much of the northern hemisphere polar cap, have been upgraded to enable a form of scanning which can be carried out every 3.7 seconds without compromising on the large field-of-views of the radars. When data from all Borealis radars are combined, a 32-fold temporal resolution improvement over traditional SuperDARN convection maps is achieved. We call this new data product the Fast Borealis Ionosphere (FBI).

The SuperDARN FBI allows for the study of highly transient and quickly evolving ionospheric phenomena (on the order of seconds) that span several thousands of kilometres, such as transient flow bursts, polar cap patches, substorm-related enhancements, and more. In this presentation, we show FBI results for events highlighting its capabilities in capturing transient ionospheric dynamics, along with several conjunction studies with satellites and other ground-based instruments (such as all-sky cameras).

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### Keyword-2

SuperDARN

### Keyword-3

Space Weather

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