

Spatial-temporal variations of the SAPS structure with recurrent period of a few minutes observed by the SuperDARN HOP radars

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Super Dual Auroral Radar Network (SuperDARN) is a powerful tool for monitoring ionospheric plasma convection not only at high latitudes, but also at sub-auroral and mid- latitudes. The SuperDARN Hokkaido Pair (HOP) of radars are 2 mid-latitude SuperDARN radars, located at the lowest geomagnetic latitude (36.9 degrees) at present. In this paper, the SuperDARN Hokkaido Pair (HOP) of radars data with special operation modes are used to study the spatial-temporal structure of the wavy variations of plasma flow with recurrent period of a few minutes embedded in larger-scale, fast flow structures at subauroral latitudes (SAPS). We focus mainly on the events on Sep 08, 2017 and Aug. 26, 2018, both of which occurred near the peak of large geomagnetic storm (minimum Dst: -124 nT and -174 nT). These events were recorded by the SuperDARN radars with higher temporal resolution (3 and 12 seconds respectively) camping beams. Using both camping beam data and 2-dimensional data (with 1 to 2 min temporal resolution) enable us to examine the period, wavelength and propagation speed of these wave structures. In addition, using the data with the new fitting algorithm (fitacf Ver. 3) we have more extended coverage of the echo regions. The wave structures have limited spatial extent in magnetic local time. On the other hand, there are several differences between these events such as period, propagation speed and geomagnetic latitude. Their possible generation mechanisms will be discussed.

Keywords: SuperDARN, SAPS, wave variations