Break up of a polar cap patch in the nightside ionosphere due to a flow channel event

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Flow channel events have previously been observed breaking up polar cap patches on the dayside ionosphere but, to the best of our knowledge, have not been observed on the nightside. We report observations of a flow channel event in the evening of the 9th January 2019 under quiet geomagnetic conditions. This multi-instrument study was undertaken using a combination of multiple EISCAT (European Incoherent Scatter) radars, SuperDARN (Super Dual Auroral Radar Network), MSP (Meridian Scanning Photometer) and GNSS (Global Navigation Satellite System) scintillation data. These data were used to build a picture of the evening’s observations from 1800 to 2359 UT. The flow channel event lasted a total of 13 minutes and was responsible for segmenting a polar cap patch. A decrease in electron density was observed, from a patch value of $1.4 \times 10^{11}$ m$^{-3}$ to a minimum value of $5 \times 10^{10}$ m$^{-3}$. In addition, ion velocities in excess of 1000 ms$^{-1}$ and ion temperatures of greater than 2000 K were also observed.