

## Reviewer 1

Lines 30-33. The authors misinterpreted my previous comment about “a steady state phenomenon” and the reference to Dungey, 1961. I think when one discusses magnetic reconnection, one should have the Dungey reference there. His picture/theory was the first for the magnetosphere and it should definitely be cited. I was just reacting to the comment about “steady state convection”. One need not use that phrase. Your current phrase “thought to be either continuous (quasi steady) or pulsed (impulse)” is also not needed either.

I suggest putting back the Dungey, 1961 reference and adding Tsurutani and Meng, 1972 to the list. The latter will take care of observations to substorms and the AE indices.

**Line 29-31 now revised:** *“The magnetic reconnection on the dayside magnetopause leads to open magnetic flux carried over the polar cap to the magnetotail (Dungey, 1961; Tsurutani and Meng, 1972; Russell and Elphic, 1978, 1979; Provan et al., 1998).”*

I had mentioned (with references) that short duration (less than ~15 min) southward magnetic fields had not shown any geomagnetic effects. The flux transfer events are probably seconds in duration, so it is unclear whether they could cause your polar patches or not. One has no idea how long they would have to last to make a polar patch. But maybe leave those references?

*We agree that some of the FTE signatures observed by RISR were short, but the FoV of RISR is limited.*

## Reviewer 2

Lines 142-143: Please describe the maximum / minimum latitudes of the RISR-C and RISR-N fields of views. The authors are not kind to the audience because they require us to check another paper’s figure, and even I look at Figure 1 of Gillies et al. (2016), it is not easy to connect their Figure 1 and the current Figure 2. Please clarify which parts correspond to RISR-C or RISR-N, which are mentioned several times in the current manuscript.

We have clarified the geographical areas covered by RISR-N and RISR-C:

Lines 76-77: *“The Resolute Bay Incoherent Scatter Radars (RISR) covering latitudes from 75° to 81°N (RISR-N) and from 69° to 75°N (RISR-C) are located at a geographic latitude of 74.70°N and geographic longitude of 94.83°W.”*

**Lines 145-146:** *“Fig. 2a shows Ne and anti-sunward Ve averaged over the longitude span of the RISR-N beams (from 75° to 100°W) and RISR-C beams (from 93° to 107°W...)” We retained the reference to Gillies et al. (2016; see, their Fig. 1).*

Line 182 and Figure 4 caption should describe that the convection map based on the SuperDARN observations.

Line 182: “global ionospheric convection map: should be “SuperDARN global convection map”

Figure 4 caption: “Ionospheric convection and potential maps” should be “SuperDARN ionospheric convection/potential map”

**Line 182 and Figure 4 caption** now clarify that the convection/potential maps are the SuperDARN observations.