

Comment on egusphere-2022-593

Anonymous Referee #2

Referee comment on "Mid-Latitude Neutral Wind Responses to Sub-Auroral Polarization Streams" by Daniel D. Billett et al., EGU sphere,
<https://doi.org/10.5194/egusphere-2022-593-RC2>, 2022

This study focuses on a Sub-Auroral Polarization Stream (SAPS) occurrence from November 9th, 2013, and aims to understand how this event impacts the behaviour of mid-latitude thermospheric neutral winds. The authors utilise four mid-latitude SuperDARN radars to observe the SAPS flow and two Fabry-Perot Interferometers (FPIs) to study the response of the neutral winds. They find that the winds show different responses depending on where they were located compared to the SAPS flow. The authors suggest that the difference is due to a combination of the pressure gradient force, Coriolis force, and ion-drag force. This paper is well written, with a clear structure and results clearly shown and discussed. This paper is a good contribution to the field of Ionosphere-Thermosphere coupling. There are some technical corrections, which are identified below.

- The surname of one of the co-authors is misspelled: Chariter should be Chartier.
- Line 40: The digit '4' is used here when referring to the SuperDARN radars used but in the rest of the paper 'four' has been spelled out.
- Line 40: 'FPIs' is incorrectly written: 'that the FPIFPIss both observed'
- Throughout the paper the Wallops Island SuperDARN radar is referred to as 'Wallops' only, including in the relevant figures and their captions.
- Line 99: 'the "main phase" of geomagnetic' change to 'the "main phase of [a/the] geomagnetic'
- (Optional) Line 103: When mentioning the plots in Figure 2 of the SuperDARN data, they can specifically be referred to as 2c-f.
- Line 115: The units of this line do not need to be in italics: 'where they reach approximately 30ms⁻¹'.
- Line 150: When defining what SSUSI stands for, the first S stands for 'Special'.
- Line 151: The D in DMSP is spelled 'Defense'.
- Line 168: 'exist' not 'exists'.
- (Optional) Line 196: For consistency with the rest of the paper, 11 UT could be written as 11:00 UT. Line 201: 03 UT could be written as 03:00 UT
- Line 205: 'lower-latitude winds is may...', the 'is' should be removed.
- Line 270: 'Polarization' with a 'z'