

Statistical study of SAPS occurrence characteristics using the SuperDARN HOKkaido Pair of (HOP) HF Radars

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We investigate the occurrence characteristics of Sub-Auroral Polarization Streams (SAPS), using the Super Dual Auroral Radar Network (SuperDARN) Hokkaido pair of (HOP) radars. The goal is to clarify the longitudinal dependence of SAPS occurrence characteristics. In this study, we studied the occurrence rate of the flow that can be considered as SAPS, vs MLT and MLAT by using the beam swinging technique (*Ruohoniemi et al., 1989*) and ovation technique (*Kunduri et al., 2017*). Finally, we could catch the true occurrence characteristics of SAPS. We set criteria for the SAPS event, i.e., the flow speed should exceed 150 m/s and should have mainly westward component. We obtained the overall characteristics of SAPS, i.e., equatorward shift of high occurrence rate region with increasing MLT and geomagnetic activity. Some of the characteristics are different from previous studies (e.g., Kunduri et al., 2017). The SAPS regions seem to be located at higher latitudes than the previous studies and the SAPS occurrence peak regions are located at later MLT. These differences might be due to the difference in geographic longitude, as well as the relative values between geographic and geomagnetic latitudes (Far-East Siberia to Pacific vs North American region). We also found new feature, i.e, westward flows from midnight to morning at relatively low geomagnetic latitudes, that could not be caught in the previous studies probably due to the limitation of radars fields of view, especially lower latitude boundary.

Keywords: SAPS, SuperDARN, magnetosphere-ionosphere coupling, geomagnetic activity