

Statistical study of SAPS occurrence characteristics using the SuperDARN Hokkaido HF radar

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We investigate the occurrence characteristics of Sub-Auroral Polarization Streams (SAPS), using the Super Dual Auroral Radar Network (SuperDARN) Hokkaido East radar. The ultimate goal is to clarify the longitudinal dependence of SAPS occurrence characteristics using the whole SuperDARN radars. In this study, we statistically analyzed about 10-year data from 2007/1/1 to 2016/12/31 and studied the occurrence rate of the flow that can be considered as SAPS, vs MLT and MLAT. Assuming that the flows are east-west oriented, we set the criteria for line of sight velocity of > 80 m/s and echo power of > 3 dB. 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. 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 (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: magnetosphere-ionosphere coupling, SAPS, SuperDARN, geomagnetic activity