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# Observations of the development of mesoscale transient flow channels in the winter cusp ionosphere by the EISCAT Svalbard Radar

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We have analyzed high-resolution EISCAT Svalbard Radar (ESR) ion flow data with the purpose of classifying transient flow channels in the cusp ionosphere. A high-resolution azimuth scan mode at constant 30° elevation was developed to map out and follow the motion of ionospheric patches. In the patch mode, the EISCAT Svalbard Radar is operated as a windshield wiper, sweeping 60-120° wide sectors in azimuth every 2-3 minutes [Carlson et al., 2002]. The high spatial and temporal resolution of this mode makes it possible to observe ionospheric flow transients associated with pulsed reconnection. The definition of flow channel used here is a longitudinally elongated segment of enhanced ion flow in the opposite direction of the background flow. These transient flow channels have a life time from ˜5 to 30 minutes. When they appear, they are localised along a stripe of radar gate elements (˜20 km wide), and they then expands up to several hundred kilometres before they slow down and fade out. The longitudinal dimension typically expands from a few tens of kilometres and they have almost always exceeded the radar field of view when fully developed (>500-1000 km). In 36 hours of radar operation in the 09-15 MLT sector, or 767 scans, we have found the presence of a flow channel in 16% of the scans. The new observations of the development of flow channels will be discussed in relation to cusp auroral dynamics.