

Excitation of non-vortex plasma convections in near-Earth region at aurora expansion

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Field line reconfigurations observed by geosynchronous satellites during substorm onset (auroral expansion) show a formation of non-vortex plasma convections in the night-side equatorial plane, clockwise (CW) and counterclockwise (CCW) in pre- and post-midnight sectors, respectively. In this report, we estimated longitudinal propagation characteristics of the plasma convections using ground magnetometer data recorded at the auroral zone (LGR; 62.23 N, 331.27 and LRG; 64.05 N, 316.26 in geomagnetic coordinates) for two events of aurora expansions (0330UT January 02 and 0443UT January 24). We found that the ground wave lengths were 2419km and 3226km and propagated westward at velocities of 60.5km/s and 35.8km/s for the January 02 and January 24 events, respectively. In the equatorial plane where field lines of ground stations were mapped (~5.8Re), the propagation velocities and wavelength were estimated to be 576km/s and 341km/s, and 3.6Re and 4.8Re, respectively. We suggest that excitation of non-vortex plasma convections can be explained by near-Earth passage of the substructures of the Bursty Bulk Flow.

