

## An auroral poleward expansion as observed by all-sky TV and magnetometer on board geosynchronous satellites

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Using all-sky TV images, we studied five events of auroral poleward expansion in 1986: four events occurred in central Canada during the Global Auroral Dynamics Campaign on January 2, 24, 27, 29 and one event occurred at the Syowa base in Antarctica on June 16, 1986. Two geosynchronous satellites, Goes5 and 6, were positioned at auroral conjugate points for the four January events, and the same two satellites were located at the dusk sector for the June 16 event. We found satellite magnetometer records of simultaneous onset of quasi-periodic oscillations in the Pi2 band at the onset of poleward expansion of aurora. In the horizontal plane (V-D plane with V as radial outward and D as dipole east), the quasi-periodic oscillations showed either CCW or CW rotations in the midnight sector. In the dusk sector, the oscillations were linearly polarized in azimuth. It was noted that the CCW rotations tended to be observed on the eastern side of the poleward expansion; CW rotations, on the other hand, were seen on the western side of the poleward expansion. The CW/CCW rotations were accompanied by a modulation of both dipolarization and field magnitudes at geosynchronous altitudes. The Pi2's were simultaneously observed in low latitudes, and could be explained by signals launched from those field changes in the magnetosphere. As an explanation for the observed polarization patterns, a generation of surface waves by a bifurcation of fast earthward plasma flows in the night side magnetosphere is the most plausible candidate. Luminosity of the poleward arc that appeared in the higher latitude portion after the poleward expansion of aurora was modulated at the frequency band of surface waves. Those periodic auroras could be mapped to 10-30Re in the magnetotail by means of the T89c and T96.01 model of field lines.