

## Formation and Development of Poleward Boundary Intensifications of Auroral Emission

# Shinichi Ohtani[1]; Tetsuo Motoba[2]; Akimasa Yoshikawa[3]

[1] The Johns Hopkins University Applied Physics Laboratory; [2] STEL/Nagoya Univ.; [3] ICSWSE/Kyushu Univ.

The present study is motivated by a recently proposed idea that the poleward boundary intensification (PBI) of auroral emission is an effect of electrostatic polarization. As the fast polar cap flow approaches the auroral oval, field-aligned currents (FACs) are induced at the poleward boundary because of the steep gradient of ionospheric conductance, which may be associated with the formation or intensification of an auroral form. In this study we examine four PBI events and address how well the observed longitudinal extension and associated current systems can be explained in terms of ionospheric polarization. The observations are summarized as follows: (1) the PBIs actually take place equatorward of the open-closed boundary; (2) the PBIs are collocated with an upward FAC, which closes with an adjacent downward FAC through the ionosphere forming a longitudinally extending convection channel; (3) the PBIs extend longitudinally in the same direction as the longitudinal convection; (4) the PBIs extend both eastward and westward immediately following the arrival of the fast polar cap flow; (5) in one event ground magnetic variations can be explained by a moving upward FAC, which suggests that the current system associated with the PBIs is not unique. Whereas caution needs to be exercised in generalizing these results, they suggest that the ionospheric polarization plays an important role in the formation and evolution of the PBIs. It is also suggested that the spatial development of the PBIs may be preconditioned by preceding auroral activity and preexisting ionospheric convection.