



## **Sun-aligned arc motion driven by magnetic reconnection under northward IMF**

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Korea Polar Research Institute (KOPRI) has operated All-Sky Camera (ASC) in the visible wavelength range at Jang Bogo Station (JBS, 74.6°S, 164.2°E) to monitor auroral dynamics in the polar region. In this study, we investigated multiple sun-aligned arcs observed under steady positive and negative values of interplanetary magnetic field  $B_z$  and  $B_y$  components on 31 July, 2019. These arcs appeared in the dawn sector and propagated to the poleward at speed of several hundreds m/s. Additionally, plasma drift velocities were observed using sounding radar installed at JBS. We found that the propagation velocities of arcs were comparable to the plasma drift velocities in the polar region. This result support the hypothesis that the arc motion is closely related to the ionospheric convection. To further examine the relationship between arc motion and polar cap convection, we estimated polar cap potential pattern using 3-D MHD simulation. Under steady northward and westward IMF condition, magnetic reconnection occurred at high latitudes in the dusk sector of the southern hemisphere. As the reconnected open field lines moved to the tailward through the dayside, they generated poleward convection in the dawn sector. This is attributed to the stationary nature of field lines in the dawn sector due to the dipole tilt. We suggested that this poleward convection, induced by stationary magnetic field lines, influences to the motion of sun-aligned arcs in the polar region.