

Conjugate observations of the evolution of polar cap arcs in both hemispheres

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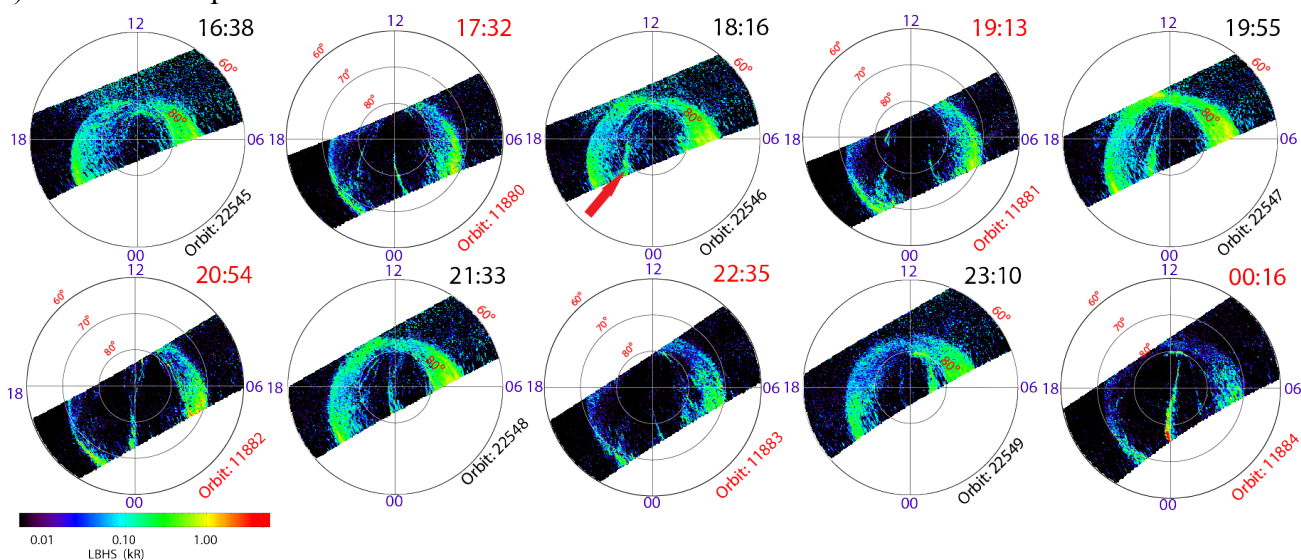
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We report results from the analysis of a case of conjugate polar cap arcs (PCAs) observed on February 5, 2006 in the northern hemisphere by the ground based Yellow River Station all-sky imager (Svalbard) and in both hemispheres by the space based DMSP/SSUSI and TIMED/GUVI instruments. The PCAs motion in dawn-dusk direction shows a clear dependence on the interplanetary magnetic field (IMF) B_y component and presents a clear asymmetry between southern and northern hemispheres, i.e., formed on the duskside and moving from dusk to dawn in the northern hemisphere and vice versa in the other hemisphere. The already existing PCAs' motion is influenced by the changes in the IMF B_y with a time delay of ~70 minutes. We also observed strong flow shears/reversals around the PCAs in both hemispheres. The precipitating particles observed in the ionosphere associated with PCAs showed properties of boundary layers plasma. Based on these observations, we might reasonably expect that the topological changes in the magnetotail can produce a strip of closed field lines and local processes would be set up conditions for the formation and evolution of PCAs.

Keywords: Polar cap arc, Conjugacy, Interplanetary magnetic field

(a) North Hemisphere

February 5, 2006



(b) South Hemisphere

