

# DOUBLE MERGING AND FORMATION OF THE LOW LATITUDE BOUNDARY LAYER UNDER NORTHWARD IMF: POLAR OBSERVATIONS

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Analyses of plasma and magnetic field data from Polar spacecraft show that magnetosheath-like plasma is frequently observed deep (in terms of distance from the magnetopause and in invariant latitude) in the magnetosphere. One such case occurred during a long period of northward interplanetary magnetic field (IMF) on March 18, 2006 and shows injected magnetosheath ions within the magnetosphere with velocity distributions resulting from two separate merging sites along the same field lines. Cold ionospheric ions were also observed counterstreaming along the field lines, evidence that these field lines were closed. These results support the idea that double reconnection under northward IMF on the same group of field lines can provide a source for the LLBL. The flow direction of the accelerated magnetosheath ions antiparallel to the local magnetic field and the location of the spacecraft suggest that these two injection sites were located northward of the spacecraft position. Also, the observed convection velocities of the magnetic field lines are not consistent with those expected for post-cusp reconnection in both hemispheres. However, these observations do favor a scenario in which a group of newly closed field lines was created by a combination of merging at high latitudes in the northern hemisphere between nearly antiparallel fields and merging at lower latitudes at the dayside magnetopause.