



IMF Bx Effects on Interhemispheric Polar Cap Asymmetries Inferred From Conjugate Auroral Imaging

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A number of studies of conjugate images of the aurora in the two hemispheres have shown that the auroral ovals are not symmetric, and that the displacement from symmetry depends on the orientation of the IMF. Most studies of this phenomenon have focused on the effect of the B_y component of the IMF, and found that the displacement is consistent with a partial penetration of the IMF into the closed magnetospheric field lines. In this study, we look at how the IMF B_x component affects auroral asymmetries, using global conjugate images from the IMAGE and Polar satellites. On 12 May 2001, during a time when the B_y component was close to zero, and the IMF B_x component was large, we observe an asymmetry which arises in conjunction with poleward expansion of the aurora, consistent with IMF B_x penetration into the magnetosphere through tail reconnection. We also calculate the flux inside the auroral ovals, a region which can be interpreted as the ionospheric footprint of the open field lines (lobes). Due to Gauss's law for magnetism, the total flux in this region must be the same in both hemispheres, and any local asymmetry in magnetic flux must be balanced by an opposite asymmetry elsewhere. To further quantify the IMF B_x influence, we also look at other events with global conjugate images.