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A case study of auroral conjugacy based on global imaging

B. Krøvel Humberset, N. Østgaard, and K.M. Laundal
Dept. of Physics and Technology, University of Bergen, Norway

Simultaneous global imaging in the ultraviolet wavelength by the IMAGE and Polar satellites gives unique tools to study the dynamics of the auroral ovals. When mapped onto apex coordinates, one finds that the auroral features in the conjugate hemispheres usually are not symmetric. Earlier studies have demonstrated a correlation between the longitudinal asymmetry of certain auroral features and the B_Y component of the interplanetary magnetic field (IMF), which is interpreted as a partial penetration of the IMF into the closed magnetospheric field lines. In this study we use global conjugate images obtained by IMAGE-FUV and VIS Earth cameras on 22 October 2001. The images form an unprecedented long time series that lasts for 5 hours from 07.00 UT to 12.00 UT. We observe two substorms and reveal asymmetric auroral features. During this time the IMF has a dominant negative B_X component, while the B_Y component is weaker and changes from negative to positive at the end of the interval. We try to answer the question: How can the observed latitudinal, longitudinal and intensity asymmetries be explained by the solar wind parameters?