



The asymmetric geospace as displayed during the geomagnetic storm on August 17, 2001

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Previous studies have shown that conjugate auroral features are displaced in the two hemispheres when the interplanetary magnetic field (IMF) has a transverse (Y) component. It has also been shown that a B_Y component is induced in the closed magnetosphere due to the asymmetric loading of magnetic flux in the lobes following asymmetric dayside reconnection when the IMF has a Y component. The magnetic field lines with azimuthally displaced footpoints map into a "banana" shaped convection cell in one hemisphere and an "orange" shaped cell in the other. Due to the Parker spiral our system is most often exposed to a B_Y dominated IMF. The dipole tilt angle, varying between $\pm 34^\circ$, leads to warping of the plasma sheet and oppositely directed B_Y components in dawn and dusk in the closed magnetosphere. As a result of the Parker spiral and dipole tilt, geospace is most of the time asymmetric. The magnetic storm on August 17, 2001 offers a unique opportunity to study the dynamics of the asymmetric geospace. IMF B_Y was 20-30 nT and tilt angle was 23° . Auroral imaging revealed conjugate features displaced by as much as 4 hours magnetic local time. The latitudinal width of the aurora was quite different (up to 6°) in the two hemispheres. The auroral observations together with convection patterns derived entirely from data indicate both dayside, lobe and tail reconnection in the north, but only dayside and tail reconnection in the southern hemisphere. Increased tail reconnection during substorms reduces the asymmetry.