



Near-Earth magnetotail shrinkage caused by the enhanced dynamic pressure of solar wind

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During the interval 06:14-07:30 UT on August 24, 2005, since the Earth's magnetopause was suddenly compressed by the persistent high-speed solar wind streams with a southward component of the interplanetary magnetic field (IMF), the magnetopause moved inward for about 3.1 RE. Meanwhile, TC-1 satellite shifted from the northern plasma sheet to a northern lobe/mantle region, although it kept inward flying during the interval 06:00-07:30UT. The shift of TC-1 is caused by the simultaneous inward displacements of the plasma sheet and near-Earth lobe/mantle region, and their inward movement velocity is larger than the inward motion velocity of TC-1. The joint inward displacements of the magnetopause, the lobe/mantle region and the plasma sheet indicate that the near-Earth magnetotail shrinks inward due to the magnetospheric compression by the high-speed solar wind streams, and the magnetospheric ions are attached to the magnetic field lines (i.e. 'frozen' in magnetic field) and move inward in the shrinking process of magnetotail. The large shrinkage of magnetotail indicates that the near-Earth magnetotail compression due to the enhanced dynamic pressure of solar wind is much larger than its thickening caused by the southward component of the IMF, and the locations of magnetospheric regions with different plasmas vary remarkably with the variation of the solar wind dynamic pressure.