# Variations of magnetic field structure in the inner magnetosphere associated with a geomagnetic storm

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In order to understand the local time asymmetry of the magnetic field structure in the inner magnetosphere during geomagnetic storms, we investigate magnetic field deviations caused by the ring current and the field aligned current, using data from magnetometers on board the TSUBASA(MDS-1) satellite and ground stations. Magnetic field deviations, dBx, dBy, dBz are obtained by subtracting the IGRF-10 model from the observed magnetic fields in the SM coordinate. We then compared the dBx, dBy, dBz with deviations of the north-south component (x) and the east-west component (y) of the magnetic field on the ground, and found that these magnetic variations were caused by the ring current and field-aligned current in the inner magnetosphere.

During the geomagnetic storm on September 7, 2002, with the minimum SYM-H of -168 [nT], the TSUBASA satellite passed through the low-latitude (around 20 degrees, MLAT) region beyond the altitude of 4 [Re] near the dusk. The magnetic field deviations in this region showed negative deviations in the dBy and dBz components, while positive deviations in the dBx. The dBx and dBy may be caused by upward field-aligned currents. On the other hand, dBz was negative with magnitude of up to 300 [nT] at the distance of 2 [Re] near the geomagnetic equator in the premidnight sector (20 - 22 MLT). The result implied that the westward ring current was developed in the inner magnetosphere up to 2 [Re] .