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Investigation of rapid multiple dipolarizations observed by the Polar spacecraft near 9 RE

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The Polar spacecraft has probed the near-Earth tail region at 9 RE with its orbit in the meridian plane and apogee near the magnetic equator. The onboard magnetometer frequently recorded dipolarizations of the magnetic field during the crossing of the current sheet, including rapid multiple dipolarizations. The interval between two rapid dipolarizations is about 30 minutes, which is close to the time interval of multiple Pi 2 pulsations in a substorm. In several events, three or more dipolarizations occur within 2 hours, but most events have two rapid dipolarizations. The normal component of the magnetic field to the current sheet rises in a stepwise manner in some events. Otherwise it recovered to the previous level before the next dipolarization. Rapid multiple dipolarizations may occur in a single substorm. However, which dipolarization corresponds to the major onset of the substorm and how the magnetosphere reconfigures so quickly needs further study.