近尾部における電流密度分布の直接観測

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Statistics of current densities in the near-Earth tail

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Cross-tail current sheet and field-aligned current in the tail vary dynamically during substorms. This study examines spatial and temporal characteristics of current-density vectors using THEMIS multi-spacecraft observations in the near-Earth magnetotail. New technique is proposed to evaluate current densities without assuming any current sheet profiles, which uses 5-min averaged magnetic field measurements. Rich data set allowed us to infer the north-south profile of the cross-tail current sheet. On average, current sheet is found to be thick and bifurcated. Presumably owing to this non-uniform profile, local current density occasionally becomes very intense to compare with its ground (minimum) values. Origin of intense current densities and its relationship with substorms are discussed.