

## サブストーム開始前後に観測される高い電流密度

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## High current density observations in the near-Earth plasma sheet before and after the substorm onset

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The statistical properties of the near-Earth current sheet from 8 Re to 12 Re were recently revealed by the THEMIS multi-spacecraft measurements [Saito, 2015]. A typical cross-tail current density in the near-Earth tail ( $X = -8$  to  $-12$  RE) was found to be  $\sim 2$  nA/m<sup>2</sup>, while in some cases, the current density increased above 4 nA/m<sup>2</sup>. High current density of the cross-tail current sheet in the near-Earth ( $X \sim -10$  RE) plasma sheet is a prominent signature during the growth phase of substorms. To understand where the tail energy is stored and released, temporal evolution of the current density was analyzed based on the THEMIS multi-point magnetic field data from 2007 to 2013. In the tail outside  $X \sim -10$  RE, the high current density was observed before the onset and decreased gradually during the expansion phase, being consistent with the previous studies. However, in the inner edge of the tail ( $X \sim -8$  RE), the current density was also high in quiet times. In addition to that it increased temporally after the onset for a few to several minutes. These high current density observations before and after the onset suggest that the tail energy is released outside  $X \sim -10$  RE and that new current system, which may be related to the aurora formation, is formed after the onset within  $X \sim -8$  RE.