



Evolution of the near-Earth magnetotail current sheet during a double-onset substorm under a weak solar-wind driver

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We study the evolution of the tail current sheet in the course of a double-onset substorm from 0220 UT on 16 Feb 2008 during interval of gradual northward IMF turning. THEMIS and GOES spacecraft were distributed between 6.6 and 18 RE downtail. A weak auroral electrojet onset took place at 0220 UT when a thin current sheet was extended near 10-11 RE. Earthward fast flows with dipolarization fronts were detected in this region followed by signatures of magnetic flux pile-up. The 0243 UT onset disturbances were more intense. Auroral expansion took place in a wider area extending more poleward and equatorward. Reconnection region tailward of 18 RE activated involving lobe flux merging. These observations suggest that the first small activation (0220 UT) and subsequent activations of reconnection Earthward of 18 RE lead to pile-up of flux in the inner magnetosphere and redistribute the Bz to form a thin current sheet with small Bz in the midtail region tailward of 18 RE. This makes favorable conditions for another onset of reconnection tailward involving lobe flux and thereby allowing the large scale reconfiguration of the tail for the second onset (0243 UT). This reconfiguration process in the current sheet possibly enabled a relatively strong high-latitude substorm despite the rather weak IMF driver.