

## Dependence of magnetotail variations on substorm intensity

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In the previous studies, we have performed statistical analyses of magnetotail variations associated with substorm expansion onset. It was concluded that the magnetic reconnection occurs first around  $X=-20$  Re, on average, a few min before onset, and the dipolarization around  $X=-10$  Re occurs immediately after onset, which is simultaneous with substantial evolution of a plasmoid around  $X=-30$  Re. These results, however, were obtained without taking into account different levels of substorm intensity. In the present study, we examine the dependence of magnetotail variations on substorm intensity. Since onset latitudes in the ionosphere depend critically on substorm intensity, the magnetotail region where the substorm-associated variation first appears is expected to depend on substorm intensity as well. The dependence of the onset location on substorm intensity, or the amount of released energy, is important for understanding when the substorm is initiated and what conditions are required. We classify 398 substorm events determined from Polar UVI data into groups of small and large substorms by negative H excursions at high latitudes. Then, using GEOTAIL data, we statistically study the differences of magnetotail variations associated with onset between the groups.