

## Auroral breakup and magnetotail reconnection based on Geotail and Polar observations

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We discuss that magnetic reconnection does not necessarily trigger auroral breakup (substorm). It has been known that reconnection-associated fast flow is occasionally observed in the magnetotail at the times of auroral breakup. However, it has also been known that satellite often observed no reconnection signature for breakup. We first show our statistical results that plasmoid is almost always observed when a satellite is located near breakup longitudes, indicating that reconnection is likely to always be occurring at the times of auroral breakup. On the other hand, it has been reported that reconnection-associated flow was sometimes not accompanied by auroral breakup, being interpreted that reconnection was not fully developed for such cases. We then show a case that even fully-developed reconnection was not accompanied by auroral breakup. These observational results indicate that there are different types of reconnection occurring in the magnetotail: One type of reconnection causes disturbance both earthward and tailward, and is associated with auroral breakup, while the other type of reconnection only includes disturbance that propagates tailward.