



Contributions of the tail current with substorm injections during geomagnetic storms

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We statistically analyzed 153 geomagnetic storm events (195 GOES events) to study the contributions of the tail current to SYM-H index during the early recovery phase for four different intensities. The results give the evidence that the ring current may continue to intensify after the disruption of tail current as Ohtani et al. [2001] suggested. The superposed epoch analysis of IMF Ey shows that IMF Ey can no longer support the SYM-H decreasing at the minimum of SYM-H, so it is reasonable to consider that the ring current enhancement is due to substorm-associated injection. The time scale of disruption of the tail current may depend on the intensity of geomagnetic storms. The percentage contributions of tail current to SYM-H index weaken as the intensity of geomagnetic storms increases. The effect of substorm injections has been evaluated as about half of the actual percentage of tail current for average, and the actual percentages of tail current for four intensities are 52.7%, 38.2%, 23.2% and 13.6% with an average about 35%. The tail current is dominant for the small geomagnetic storms (SYM-H > -50nT).