



Plasma sheet magnetic fields and flows during steady convection events

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Five-spacecraft Themis observations are used to examine magnetic field and plasma parameters in the magnetotail during steady magnetospheric convection (SMC) events. Over 200 SMC events occurring during 2007-2009 Themis prime mission were extracted from a large SMC-database covering over a decade. The results are compared with a dataset consisting of an equal number of events but with random geomagnetic activity conditions. Analysis of the plasma flow data show that the SMC periods are associated with flow activity with Earthward flows concentrating in the evening sector, and tailward flows originating from the region 12-20 Re, closer than the typical substorm onset location. The flow speeds are moderate, often not exceeding 200 km/s, and appear uncorrelated from spacecraft to spacecraft. The magnetic field structure shows stretching of the field especially in the inner magnetosphere evening sector, while the midtail field has a normal component which is larger than suggested by empirical models. Furthermore, the field configuration evolves during the events, as the inner tail stretching proceeds. These results are used to examine the conditions in the solar wind and magnetotail that lead to formation, sustainance, and ending of the SMC events.