Geophysical Research Abstracts
Vol. 15, EGU2013-9747, 2013
EGU General Assembly 2013

Magnetospheric Tail Plasma Sheet Boundaries in Observations and Models.

Marina Kubyshkina (1), Peter Boakes (2), Victor Sergeev (1), and Rumi Nakamura (2)

(1) St.Petersburg State University, St/Petersburg, Russian Federation (kubysh@geo.phys.spbu.ru), (2) Space Research Institute, Austrian Academy of Sciences, Graz, Austria

This study is focused on magnetospheric tail current sheet structure in the inner and middle magnetotail as observed by CLUSTER and reproduced in a set of Tsyganenko-type empirical models.

Tail current sheet is one of the most important sources of magnetospheric activity and a key region for understanding storm and substorm phenomena. Many studies were carried out to explore the structure and behavior of the tail plasma sheet during the periods of different activity. Still, due to a huge sizes and high variability, plasma sheet is much less explored if compared to the ring current regions.

All the available spacecraft observations of magnetic field values in the area of magnetospheric plasma sheet were accumulated in the empirical magnetic field models to constrain the model configuration of a current system, which will adequately reproduce the effects of the real tail current sheet.

In this study we compare the observed plasma sheet boundary position with that predicted by a set of Tsyganenko models. We then analyze the results obtained with different magnetic field models and compare the ionospheric footpoints of observed plasma sheet outer boundary with observed Polar Cup boundary. We also explore magnetic field lines, which start from the Polar Cup boundary position. The study is based on a set of simultaneous observations of Cluster plasma sheet outer boundary crossings (transition from plasma sheet to magnetospheric lobes) and Polar Cup boundary observations by low altitude spacecraft (NOAA - type orbits).

In order to have more accurate mapping we selected for this study a number of events (18 events by now) with a possibility to make the adaptive magnetic field model, which, if compared to standard Tsyganenko models, give considerably better representation of the observed magnetic field in the points of observations. These were the events where magnetic field values were measured by several spacecraft located in the similar local time region - in this study we used magnetic field observations from CLUSTER, GEOTAIL and GOES in the periods of different activity levels during the years 2005-2008 .