Geophysical Research Abstracts, Vol. 9, 00526, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00526

Magnetopause current sheet thickness and surrounding magnetic turbulence

E.V. Panov(1,2), J. Büchner(1), M. Fränz(1), A. Korth, K.-H. Fornaçon(3), H. Rème(4)

(1) Max-Planck-Institut für Sonnensystemforschung, Katlenburg-Lindau, Germany, (2) Space Research Institute, Moscow, Russia, (3) Technical University, Braunschweig, Germany, (4) CESR, Toulouse, France (panov@mps.mpg.de)

Using CLUSTER magnetic field and plasma measurements we have investigated the dependence of the middle- and high-latitude magnetopause current sheet thickness on the properties of the adjacent magnetosheath plasma. We found that the thickness is inversely proportional to the magnetosheath plasma β, while it does not vary with the ram pressure of the magnetosheath plasma. We have also investigated the power of surrounding magnetic turbulence in the frequency range from ion-cyclotron frequency up to the lower-hybrid frequency. We found that the power of the magnetic fluctuations is stronger at the magnetospheric side of the magnetopause current sheet than at the magnetosheath one. The power of the surrounding magnetic fluctuations is higher at the thinnest current sheets. This dependence is especially pronounced at the magnetospheric side of the magnetopause. We also observed that the fluctuation power of the tangential to the current sheet components of the magnetic field dominate. Assuming that the wave front of the corresponding waves is perpendicular to the direction of the minimum variance of the magnetic field fluctuations, we conclude that the waves propagate away from the magnetopause into the magnetosheath and into the magnetosphere, perpendicular to the magnetopause current sheet plane. We note that the observed magnetic turbulence may be important in the plasma transport through the magnetopause due to wave-particle interaction. In order to get feeling about the efficiency of this transport we have determined the relation of a diffusion rate estimated for the observed correlation of the magnetic and current fluctuations as a function of the magnetopause current sheet thickness and frequency.