

Fluid and charged particle behaviors of slow MHD disturbances observed in the magnetospheric plasma sheet

Takesi Iijima[1], Aoi Nakamizo[2], Manabu Shinohara[3]

[1] CRL, [2] Earth and Planetary Sci., kyushu Univ, [3] Communications Res. Lab.

Using the low-energy plasma, charged particles and magnetic field data acquired with the Geotail satellite, we have investigated the MHD fluid and charged particle behaviors of disturbances that were widely observed in the magnetospheric plasma sheet. This is an extension of the preceding study by Nakamizo and Iijima (2002), in which they found that the substance of magnetotail Pi2s is slow MHD wave. Principal characteristics determined here include the following: (1) For almost all the frequency ranges, the disturbances exhibit almost same properties; (2) Plasma and magnetic pressures vary exactly in antiphase; (3) Energy fluxes are much greater in the parallel direction to the magnetic field; (4) Very nature of the bulk is likely to be slow MHD wave; (5) Clusters of pressure in-homogeneity by charged particles are suggested to be formed prior to the development of slow wave. We conclude that the primary source of disturbances occurring in the magnetosphere-ionosphere system is ascribable to the generation of slow MHD disturbances, and also the generation of field-aligned currents (transverse Alfvén waves) coupled with the former. Charged particles instability plays a key role.