Geophysical Research Abstracts,
Vol. 11, EGU2009-4209, 2009
EGU General Assembly 2009

Fine structure of the interface between solar wind and Venusian induced magnetosphere

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At first glance the boundary between the thermalized solar wind flow and Venusian induced magnetosphere seems to be impenetrable for solar wind ions. But the detailed study of the interface region of the planetary wake shows that the structure of such boundary is rather complex. The present work is based on the Venus Express data obtained during 2006 - 2007 time interval. The study was made in coordinate frame referred to the solar wind convection eclectic field. We have distinguished four zones where structure of the interface between solar wind and induced magnetosphere and physical processes defining such a structure are quite different. These zones are located in midnight meridian co-aligned to the convection electric field and in equatorial plane containing IMF and solar wind velocity vectors. We have shown that 1) solar wind plasma can entry into induced magnetosphere in the equatorial region by the mechanism similar to the mechanism of magnetosheath plasma penetration into the Earth magnetosphere via open magnetopause; 2) There is a very strong asymmetry between polar boundary at the positive side of convection electric field ("North") and the opposite side ("South"). "Northern" interface is a very wide region with gradual variation of all parameters and with an essential mixture of the magnetosheath protons and planetary oxygen. The "Southern" indreface is a sharp boundary with a very strong separation of the two (solar wind and magnetosphere) plasma regimes.