Geophysical Research Abstracts
Vol. 13, EGU2011-3979, 2011
EGU General Assembly 2011

Ion outflow channels around Venus controlled by IMF directions

Kei Masunaga (1), Yoshifumi Futaana (2), Masatoshi Yamauchi (2), Stas Barabash (2), Teilong Zhang (3), Naoki Terada (1), and Shoichi Okano (1)

(1) Department of Geophysics, Graduate school of Science, Tohoku University, Japan (masu-kei@pparc.gp.tohoku.ac.jp), (2) Swedish Institute of Space Physics, Kiruna, Sweden, (3) Space Research Institute, Austrian Academy of Sciences, Graz, Austria

Dependence of the plasma environment around Venus on the direction of the interplanetary magnetic field (IMF) is investigated using the velocity distribution functions and the magnetic field data measured by the ASPERA-4 (Analyser of Space Plasma and Energetic Atoms) and the magnetometer (MAG) onboard the Venus Express between June 2006 and December 2008. The orbits were classified into two cases depending on the IMF directions: IMF nearly perpendicular to the Venus-Sun line (the perpendicular case) and IMF nearly parallel to it (the parallel case). In both cases, high energy O+ (>100eV) fluxes were frequently observed simultaneously with a reversal of the x component of the local magnetic field (the x-axis points towards the Sun from Venus). A single reversal was observed once per orbit in the magnetic polar regions for most of the orbits in the perpendicular case; in contrast, multiple reversals were frequently observed per orbit and were scattered randomly with respect to the convection electric field for most of the orbits in the parallel case. These results suggest that the upstream IMF direction controls the formation of the local plasma sheet. In the perpendicular case, the IMF drapes around the ionosphere, forming a single plasma sheet. In the parallel case, the IMF cannot drape around the ionosphere; this results in a more disturbed structure and creating many Bx reversal points, implying that the ion acceleration region is different from that of the perpendicular case.