Geophysical Research Abstracts
Vol. 15, EGU2013-4313, 2013
EGU General Assembly 2013

High speed jets in the subsolar magnetosheath: a statistical study

Ferdinand Plaschke (1,2), Heli Hietala (3,4), and Vassilis Angelopoulos (2)

(1) Institut für Weltraumforschung, Österreichische Akademie der Wissenschaften, Graz, Austria (ferdinand.plaschke@oeaw.ac.at), (2) Department of Earth and Space Sciences, and Institute of Geophysics and Planetary Physics, University of California Los Angeles, Los Angeles, CA, USA, (3) Space and Atmospheric Physics Group, Department of Physics, Imperial College, London, UK, (4) Department of Physics, University of Helsinki, Helsinki, Finland

We present a statistical study of plasma jets in the subsolar magnetosheath, characterized by a high dynamic pressure in anti-sunward direction, observed by the five THEMIS spacecraft between 2008 and 2011 (4 years). We required the jets' dynamic pressure in GSM x-direction to exceed half the corresponding dynamic pressure in the solar wind, as given by the NASA OMNI dataset. The high speed jets (HSJs) are found to last tens of seconds and to occur every few minutes on average. The ion density, velocity, and magnetic field within the HSJs is higher than in the surrounding magnetosheath plasma; the ion temperature, however, is found to be slightly lower and more isotropic. The HSJs are almost always super-Alfvenic, and a significant fraction is observed with super-magnetosonic speeds implying the existence of a secondary shock embedded in the magnetosheath, closer to the magnetopause. Due to the high dynamic pressure and velocity in anti-sunward direction, the HSJs are expected to impact and indent the magnetopause. The only solar wind parameter found to influence the occurrence of HSJs is the cone angle of the interplanetary magnetic field (IMF): steady, radial IMF conditions seem to be most favorable suggesting a dominant generation mechanism of HSJs being related to the upstream foreshock or quasi-parallel bow shock.