

Magnetic energy density and plasma energy density in the Venus wake

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Measurements conducted in the Venus wake with the magnetometer and the Aspera-4 plasma instrument of the Venus Express spacecraft show that in a large number of cases the kinetic energy density of the plasma in that region is comparable to that of the magnetic energy density. Observations were carried out in several orbits of the Venus Express traced by the midnight plane and suggest that the total energy content in the Venus wake is distributed with nearly comparable values between the plasma and the magnetic field. Processes associated with the solar wind erosion of planetary ions from the polar magnetic regions of the ionosphere are involved in the comparable distribution of both energy components.

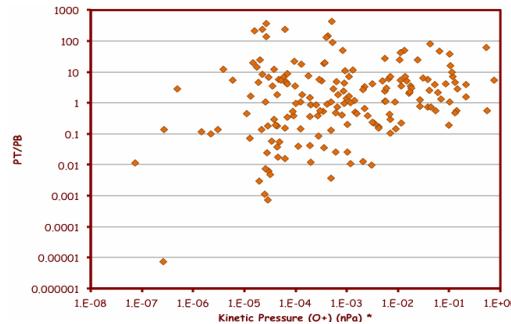


Fig. 1 – Data points obtained from measurements of the plasma properties and the magnetic field made along the VEX trajectory in 10 selected orbits during August 2006 and September 2009 traced near the midnight plane. The data points show values of the P_T/P_B ratio as a function of the kinetic pressure of the O+ ions.

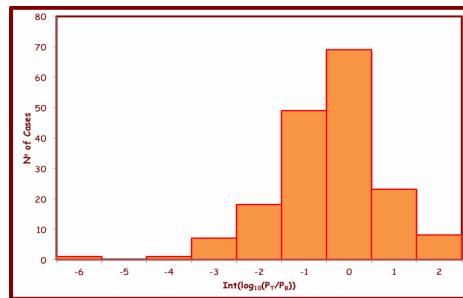


Fig. 2 – Order of magnitude distribution of the number of points in Figure 1 as a function of the P_T/P_B ratio (the peak number at $\log_{10}(P_T/P_B) = 0$ corresponds to cases in which the value of the P_T/P_B ratio occurs between 1 and 10).