



Signatures of transient plasma entry through the dayside magnetopause and cusp

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Observations of transient magnetosheath plasma entry through the dayside magnetopause/cusp frequently display a “pulsed” signature with characteristic ion, electron and magnetic field signatures. Combining Cluster CIS, PEACE and FGM data we observe how these entry processes vary with space and time. Based on the combined data set we are also able to discuss how deeply the plasma protrudes through the magnetopause. Ion pressure pulses frequently precede a transient plasma entry, followed by first down-flowing magnetosphere ions, and subsequently down- and tail-ward flowing magnetosheath ions. Upward flowing ionospheric ions together with return fluxes of magnetosheath ions indicates an ionospheric coupling/response to the plasma entry. From magnetometer data we also note that the plasma entry sets up a pair of field-aligned currents, at least one of them connecting to the dayside ionosphere and causing energization and outflow of ionospheric plasma. The latter implies localized transfer of energy by the injected magnetosheath plasma.