

Pi2 PULSATIONS: IONOSPHERE/GROUND SIGNATURES OF DYNAMIC PROCESSES IN THE PLASMA SHEET

PETER SUTCLIFFE

Hermanus Magnetic Observatory, Hermanus, South Africa
psutcliffe@hmo.ac.za

Alfvén wave transients play an important role in the dynamic coupling between the magnetosphere and ionosphere. In particular, the “switch on” of the substorm current wedge by short-circuiting of the cross-tail current to the auroral oval via field-aligned currents manifests itself as Pi2 pulsations at high latitudes. The braking of high-speed ion flows in the near-Earth plasma sheet, at the boundary between regions of dipolar and tail-like field, produce compressional pulses, which drive Pi2 cavity mode oscillations at low latitudes. In this presentation we review aspects of low latitude Pi2 pulsations, which serve as signatures of dynamic processes in the magnetotail.

Pi2 pulsations are best known for their occurrence at the time of magnetospheric substorm onsets and intensifications. However, they occur in association with other types of disturbances, all of which represent reconfigurations of magnetic flux and plasma flow in the magnetotail:

A common feature is their occurrence in association with pseudo-breakups.

Observations of Pi2 pulsations have been reported under extremely quiet solar wind conditions when the magnetosphere is in a near ground state.

Poleward boundary intensifications (PBIs) have been observed in association with ground Pi2 pulsations.

Pi2 activity is sometimes observed in association with “tail reconnection during IMF-northward, non-substorm intervals” (TRINNIIs).

There is evidence that Pi2 pulsations can be driven by pulsed reconnection in the magnetotail.

Pi2 pulsations

Peter Sutcliffe, Hermanus Magnetic Observatory, Hermanus, South Africa, psutcliffe@hmo.ac.za