

Simultaneous remote sensing and in-situ observations by Cluster and IMAGE in the vicinity of plasmaspheric plumes

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During geomagnetic disturbances, the main body of the plasmasphere moves inward and part of the outer layers gets stripped away, forming plasmaspheric drainage plume. This process named plasmaspheric erosion is not fully understood.

Plasmaspheric plumes are regions of plasmaspheric plasma, attached to the main body of the plasmasphere, but stretching outward into the more tenuous outer magnetosphere.

A recent case study has reported, during a strong magnetic storm, a direct relationship between plasmaspheric tails and sub-auroral ionospheric perturbations responsible of strong radio scintillation.

Scintillation can dramatically impact the performance of space-based communication and navigation systems, including: GPS positioning, signal fading and data drop-outs on satellite command uplinks, data downlinks and communication signals.

The four Cluster satellites and the EUV imager of the IMAGE satellite provide a unique set of observations of both in-situ and remote observations of plasmaspheric plumes.

Here, we present the results of several case studies showing the location, density and shape of plasmaspheric plumes and the physical properties of the plasma in its immediate vicinity, observed in the dusk sector.