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Statistical analysis of plasmaspheric plumes with CLUSTER/WHISPER observations

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Plasmaspheric plumes have been routinely observed by the four CLUSTER spacecraft. The CLUSTER mission provides high time resolution four-point measurements of the plasmasphere near perigee. Plasmaspheric plumes are identified from density profiles derived from the plasma frequency identified by the WHISPER instrument onboard CLUSTER. Because of the relatively high perigee of CLUSTER (4 Earth Radii), the satellites only cross the outer regions of the plasmasphere, which happen to be the most dynamic ones. We present a statistical analysis of plasmaspheric plumes observed by WHISPER during most of the CLUSTER mission (5 years of data: 1 February 2001 to 1 February 2006). Their occurrence is studied as a function of several geomagnetic indices (Kp, am and Dst). Their transverse equatorial size, magnetic local time distribution, L position and density variation are discussed. Comparisons of the density profiles of the same plume that is crossed twice in the Northern and Southern Hemisphere are also shown.