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Plasmasphere observations with Cluster completed by new data from an old mission, Dynamics Explorer-1

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Since 2000 the four Cluster spacecraft have crossed the Earth's plasmasphere every 2.5 days, with various perigee altitudes (from 4 to 1.5 R_E), different configurations (string of pearls, tetrahedron) and separations (from 10 to 100 000 km). The resulting data-set allows different types of inner magnetosphere studies and provides a huge amount of various plasmaspheric data, including plasmapause position information. It enables statistical analysis of the plasmapause or comparison with the position of the radiation belts. Moreover, plasmaspheric plumes can be studied in a statistical way or focusing on specific events, and in relation with wave activity (EMIC, electromagnetic rising tone, whistler).

Recently, data from an old mission, Dynamics Explorer-1, have become available. In particular densities and temperatures for many ions (H^+, He^+, He^{++}, O^+, and O^{++}) have been derived from the RIMS (Retarding Ion Mass Spectrometer) instrument and are available from October 1981 to January 1985. Those data, not available on-board the Cluster satellites, allow different studies and in particular the analyze of the distributions of those ions in the plasmasphere boundary layer, as a function of magnetic local time and geomagnetic activity.