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# Links between the plasmapause and the radiation belts boundaries as observed by the instruments CIS, RAPID and WHISPER onboard Cluster

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In a recently published work, we studied the relations between the position of the plasmapause and the position of the radiation belt boundaries. The Cluster mission offers the exceptional opportunity to analyze those different regions of the inner magnetosphere with identical sensors on multiple spacecraft. We compare the positions of the radiation belt edges deduced from CIS observations (electrons with energy > 2 MeV) with the positions of the plasmapause derived from WHISPER data (electron plasma frequency). In addition, we compare those results with the noundaries positions determined from RAPID observations (electrons with energy between 244.1 and 406.5 keV).
The period of 1 April 2007 to 31 March 2009 has been chosen for the analysis because at that time Cluster's perigee was located at lower radial distances than during the earlier part of the mission (as close as 2 $R_E$, deep inside the plasmasphere and the radiation belts). This time period corresponds to a long solar activity minimum.
Differences are observed between the radiation belt boundary positions obtained from the two different instruments: The radiation belt positions are related to the energy bands. The plasmapause position is more variable than the radiation belt boundary positions, especially during small geomagnetic activity enhancements. A correspondence is observed between the plasmapause position determined by WHISPER and the outer edge of the outer radiation belt of energetic electrons (> 2 MeV) observed by CIS. This result is unexpected since previous studies based on other spacecraft observations indicated a correlation between the inner edge of the outer belt and the plasmapause. However, during higher geomagnetic activity time periods, the plasmapause is located closer to the inner boundary of the outer radiation belt.
We have pursued the analysis of radiation belt boundaries positions during time period with higher geomagnetic activity, showing different characteristics. We present also some first conclusions from a comparison of those data with a global plasmasphere model and a radiation belt model.