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The role of Pc5 waves in relativistic electron losses through the magnetopause

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We have investigated the response of the outer Van Allen belt electrons to the arrival of different ICMEs (Interplanetary Coronal Mass Ejections), which trigger – or not – geospace magnetic storms and magnetospheric substorms of various intensities. To do that, we examine direct observations of equatorial electron phase space density (PSD) by using differential flux data from the Magnetospheric Electron Ion Spectrometers (MagEIS) on-board the Van Allen Probes, the Solid State Telescope (SST) of THEMIS (A, D and E), the EPIC Radiation Monitor of XMM and the MAGnetospheric Electron Detector (MAGED) of GOES 13 and 15. Observations show that losses due to magnetopause shadowing are accompanied by outward diffusion driven by Pc5 ULF waves. In addition, there is a 300 MeV/G threshold in energy that separates the source of relativistic electrons inside the outer belt even after the arrival of a prominent pressure pulse. The study is complemented by in-situ and ground-based data of the solar wind parameters and the geomagnetic indices. This work has received support from the European Union's Seventh Framework Programme (FP7-SPACE-2011-1) under grant agreement no. 284520 for the MAARBLE (Monitoring, Analysing and Assessing Radiation Belt Energization and Loss) collaborative research project.