

A Superposed Epoch Analysis on the Outer Radiation Belt Electron Flux Variability and ULF Waves Under the Influence of ICME and HSS Events

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Abstract: Interplanetary Coronal Mass Ejections (ICME) and Solar wind High-Speed Streams (HSS) cause disturbances in the Earth's magnetosphere, including the Van Allen Radiation Belts. We investigated how the electron's outer radiation belt changes respond to perturbations related to HSS and ICME events that hit the Earth's magnetosphere. We use electron flux density measurements from Van Allen's REPT instrument at 2.10 MeV and ULF waves at the Pc4-5 frequency range, together with solar wind parameters during the Van Allen Probes era, from October 2012 up to December 2017 and selected 140 HSS events and 49 ICME events. The results show that ULF Pc5 waves are present in all the cases and can play a role in the diffusion of those particles. The cases of electron enhancements, the Interplanetary Magnetic Field (IMF) behavior at z-component, solar wind speed and the substorms with waves signal can help replenish the losses on the outer radiation belt. The ULF waves are present on the reduction as well, acting on the outer radial diffusion process.

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