



On the cause of electron acceleration and loss in the outer Van Allen belt

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We investigate the response of the outer Van Allen belt electrons to various types of solar wind and internal magnetospheric forcing, to geospace magnetic storms of different intensities and to intense magnetospheric substorms. We use electron phase space density (PSD) calculations as well as concurrent Pc5 and chorus wave activity observations in the outer belt during the Van Allen Probes era to compare 20 electron enhancement and 8 depletion events. Our results indicate that the combined effect of magnetopause shadowing and outward diffusion driven by Pc5 waves is present in both groups of events. Furthermore, in the case of enhancement events, the synergy of enhanced seed population levels and chorus activity – due to the enhanced substorm activity – can effectively replenish the losses of relativistic electrons while, inward diffusion can further accelerate them .