

Radiation Belt Electrons Observed by Van Allen Probes and MMS

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The loss and rebuilding of the outer radiation belt is observed storm after storm by the Van Allen Probes, both as a result of CME events and high-speed stream events. The post storm enhancement of the outer belt relativistic electrons requires the presence of source (<75 keV) and seed (few hundred keV) electron populations during the main and early recovery phase along with intense VLF chorus waves. In addition, the Van Allen Probes have described the electron content of the slot region and inner radiation zone, which has been seldom studied because of lack of good access and the serious background conditions there. The backgrounds created by the high-energy protons that exist in the inner radiation zone and extending into the lower parts of the slot region made it difficult to obtain good measurements of the electron fluxes there. Similarly, the backgrounds from penetrating Bremsstrahlung x-rays produced by energetic electrons striking the spacecraft caused difficulty for measurements at outer edge of the slot region and inner edge of the outer zone. These difficulties have been remedied for the Van Allen Probes' MagEIS data set. Now, with the successful launch of MMS there are additional electron seed population measurements taken over a wide altitude range to complement those from the Van Allen Probes. The Van Allen Probe radiation belt observations and preliminary results from the energetic electron sensors on MMS will be reviewed.

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