



Loss of the relativistic and ultra-relativistic radiation belt electrons

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Recent observations and modeling provided significant improvements in our understanding of the energization mechanisms for the electrons in the radiation belts. However, loss processes remain poorly understood. In this study we present analysis of the evolution of electron radial profiles of fluxes, pitch angle and energy distributions. Our modeling and observational results show that different loss mechanisms are operational at different energies. Global simulations at all energies, radial distances, and pitch angles are compared to Van Allen Probes observations of electron fluxes. VERB 3D model including various waves is capable of reproducing the dynamics of pitch angle distributions and energy spectra, demonstrating which loss mechanisms dominate at different energies. Analysis of the profiles of phase space density provides additional confirmation for our conclusion and presents a novel technique that identifies the region of intense local loss due to EMIC wave scattering.