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Radial diffusion as a source and loss process in the outer radiation belt.

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The variability of the radiation belt electron fluxes is a result of a competition between various source and loss processes, which highly depend on the evolution of the plasmaspheric and ring current plasma populations. Relativistic electrons can be accelerated by the inward radial diffusion, which is most efficient at higher L-shells and by local acceleration which is most efficient right outside plasmasphere. Losses of relativistic electrons may result from pitch angle scattering of electrons by various plasma waves and losses to magnetopause. Using observations from CRRES, HEO, and SAMPEX satellites and radial diffusion modeling we show that magnetopause losses combined with outward radial diffusion may produce significant depletions of the outer radiation belt down to L=4. We also show that radial diffusion driven by gradients in phase space density redistributes radiation belt fluxes and may effectively work as a loss and source process.