Wave-driven gradual loss of energetic electrons in the slot region

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Resonant pitch angle scattering by plasma waves is one of the important mechanism to the loss of the radiation belt electrons. Based on the observations and simulations, we investigate the detailed variations of the energetic electrons(>100 keV) in the slot region driven by hiss waves and lightning generated whistlers (LGW) during the recovery phase of the magnetic storm on 1 July 2013. The spacecrafts simultaneously detected substantial decreases in fluxes of energetic electrons and intense hiss waves and weak LGW at the region L~3. Correspondingly, using the time-variant wave parameters of those waves, we calculate bounce-averaged diffusion coefficients and solve a 2-D Fokker-Planck diffusion equation, and the hiss-driven simulations of energetic electron evolution show reasonable agreement with the observation data. The results provides further support that the plasmaspheric hiss can be mainly responsible for the loss of the energetic electron in the slot region.

Keywords: slot region, hiss wave, energetic electron

