Geophysical Research Abstracts
Vol. 21, EGU2019-3490, 2019
EGU General Assembly 2019

Study on the radial diffusion of protons in the inner magnetosphere

Wenlong Liu and Xingzhi Lyu
Beihang University, Beijing, China (liuwenlong@buaa.edu.cn)

We study the characteristics of energetic protons up to hundreds of keV in the inner magnetosphere and their interaction with ULF waves through radial diffusion process. The phase space density of proton is calculated based on the MagEIS instrument onboard Van Allen Probes for the time period of March 2013, and is simulated with 1-D Fokker Planck simulation. Overall, simulation results are in good agreement with observations, suggesting radial diffusion dominates the transport of energetic protons in the region of L*<5.5. Protons can be transported to L*$\sim$4.2 for mu=200 MeV/G and to L*$\sim$3.6 for mu=100 MeV/G, respectively. During the main phases of March 15, 2013and March 29, 2013 geomagnetic storms, large differences are shown between simulation and observation with simulation overestimating proton PSD. This signature happens outside the plasmapause, suggesting non-adiabatic loss mechanism, likely EMIC wave scattering, is important during storm main phase.