Geophysical Research Abstracts
Vol. 15, EGU2013-3612, 2013
EGU General Assembly 2013

Loss rates of energetic particles in the inner magnetosphere in a realistic magnetic field using a new chorus wave model

Ksenia Orlova (1,2,3), Yuri Shprits (4,5,1), and Maria Spasojevic (6)

(1) University of California Los Angeles, Los Angeles, USA (ks13orl@gmail.com), (2) University Corporation for Atmospheric Research, Boulder, USA, (3) Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University, Moscow, Russia, (4) Massachusetts Institute of Technology, Cambridge, USA, (5) Skolkovo Institute of Science and Technology, Moscow, Russia, (6) Stanford University, Stanford, USA

Energetic electrons in the inner magnetosphere show high variability during the geomagnetically disturbed conditions. Quasi-linear diffusion theory provides a framework for global prediction of the loss of particles at different energies and understanding of dynamics of particle populations. It was recently shown that the pitch angle scattering of electrons due to wave-particle interaction with chorus waves modeled in a realistic magnetic field may be significantly different from those estimated in a dipole model. In this work we present the loss rates of 1 keV – 2 MeV electrons in a realistic and a dipole field models and give a physical explanation of the differences between them. In this study we use Tsyganenko 89 magnetic field model and estimate scattering rates for different levels of geomagnetic activity. Electrons are assumed to be scattered by oblique lower band and upper band chorus waves. We develop a realistic chorus wave model in three MLT sectors (night, dawn, and day) using the recent results of wave amplitude, wave normal angle, and wave spectral density distributions as functions of magnetic latitude, distance, and geomagnetic activity. The obtained electron lifetimes are parameterized and can be used in 2D-3D-4D diffusion codes.