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EMIC Wave Characteristics and Their Effects on the Lifetime of Energetic Electrons in Earth's Inner Radiation Belt X. SHAO, K. PAPADOPOULOS, A.S. SHARMA, A. KARAVAEV, Univ. of Maryland — The stably trapped electrons with energies ($>$ 100 keV) in inner radiation belt have lifetimes of years and can have serious effects on spacecrafts and satellites. One possible way of mitigating these hazards is to reduce electron life times through pitch angle scattering by waves. At frequencies close to the ion gyro-frequencies, the Electromagnetic Ion-Cyclotron (EMIC) waves can have wavelengths short enough to gyro-resonate with energetic electrons, which can lead to significant changes in lifetimes of electrons in inner belt. We investigated the lifetime of inner belt energetic electrons subject to pitch angle scattering with EMIC waves by calculating the diffusion coefficient. For several hundred Watts of broadband EMIC waves in the shell volume enclosed by magnetic field lines at L = 2.0 with width dL = 0.1, the lifetime of 1 MeV electrons can be reduced to a few months. This is a considerable reduction and has important consequences, including remediation of artificially enhanced energetic electron fluxes. The key issues to be investigated further are: the validity of the model of excitation and propagation of EMIC wave in a multi-ion plasma with non-uniform ambient magnetic field, the energy conversion between EMIC waves and multi-ion plasma. These are addressed by the comparing models and laboratory experiments.
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