Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

PEM08-14 Room:302 Time:May 27 09:30-09:45

Relativistic radiation belt electron precipitation induced by EMIC triggered emissions in the plasmasphere

KUBOTA, Yuko[1*] ; OMURA, Yoshiharu[1] ; SUMMERS, Danny[2]

[1]Research Institute for Sustainable Humanosphere, Kyoto University, Kyoto, Japan, [2]Department of Mathematics and Statistics, Memorial University of Newfoundland, St. John's, Canada

Electromagnetic ion cyclotron (EMIC) triggered emissions have been observed by *Pickett et al.* [2010]. EMIC triggered emissions are characterized by large wave amplitudes, rising-tone frequencies, and coherent left-hand circularly polarized waves. EMIC triggered emissions are generated by energetic protons with a temperature anisotropy. A nonlinear wave growth theory proposed by *Omura et al.* [2010] can explain the generation and growth mechanisms of EMIC triggered emissions. *Shoji and Omura* [2011] have reproduced EMIC triggered emissions by hybrid simulations in agreement with the nonlinear wave growth theory. The wave potential generated by coherent EMIC triggered emissions can trap some of electrons and guide them down to lower pitch angles efficiently [*Omura and Zhao,* 2012]. Repeated interactions occur due to the mirror motion, and result in the scattering of particles into the loss cone. Test particle simulations of electrons interacting with EMIC triggered emissions with a variable frequency and constant amplitude have been performed and the results show efficient electron precipitation induced by the wave trapping in a parabolic magnetic field [*Omura and Zhao,* 2013]. From recent observations by THEMIS, it is found that some EMIC triggered emissions have sub-packet structures [*Nakamura et al.,* 2014]. We perform test particle simulations of relativistic electrons interacting with EMIC triggered emissions which form sub-packets in a dipole magnetic field. We include the convective growth of the waves in setting up the EMIC wave model for test particle simulations [*Omura et al.,* 2010; *Shoji and Omura,* 2013]. By utilizing a three dimensional dipole magnetic field, we can trace electrons drifting in the longitudinal direction. We study trajectories of longitudinally distributed relativistic radiation belt electrons drifting eastward interacting with local EMIC triggered emissions. We obtain the relativistic electron distribution in equatorial pitch angle and in pitch angle at the atmosphere.

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Keywords: relativistic electron, radiation belt, EMIC, EMIC triggered emission, precipitation, pitch angle