



New signatures of EMIC wave-driven loss of ultrarelativistic electrons in the heart of the outer radiation belt

Nikita Aseev (1,2), Yuri Shprits (1,2,3), Adam Kellerman (3), Alexander Drozdov (3), Dedong Wang (1), Irina Zhelavskaya (1,2)

(1) GFZ German Research Centre for Geosciences, Potsdam, Germany, (2) Institute of Physics and Astronomy, University of Potsdam, Germany, (3) University of California Los Angeles, CA, USA

Major mechanisms controlling ultrarelativistic electron population (energy > 1-2 MeV) are still under debate. In this study, we demonstrate new observational evidence of loss of ultrarelativistic electrons that can be driven by resonant interaction with electromagnetic ion cyclotron (EMIC) waves. We analyzed the phase space density profiles derived from Van Allen Probe particle data as a function of time and three adiabatic invariants between 9 October and 29 November 2012. New local minimums in the profiles are accompanied by the narrowing of normalized pitch angle distributions and ground-based detection of EMIC waves. Such a correlation is indicative of ultrarelativistic electron precipitation into the Earth's atmosphere caused by resonance with EMIC waves.